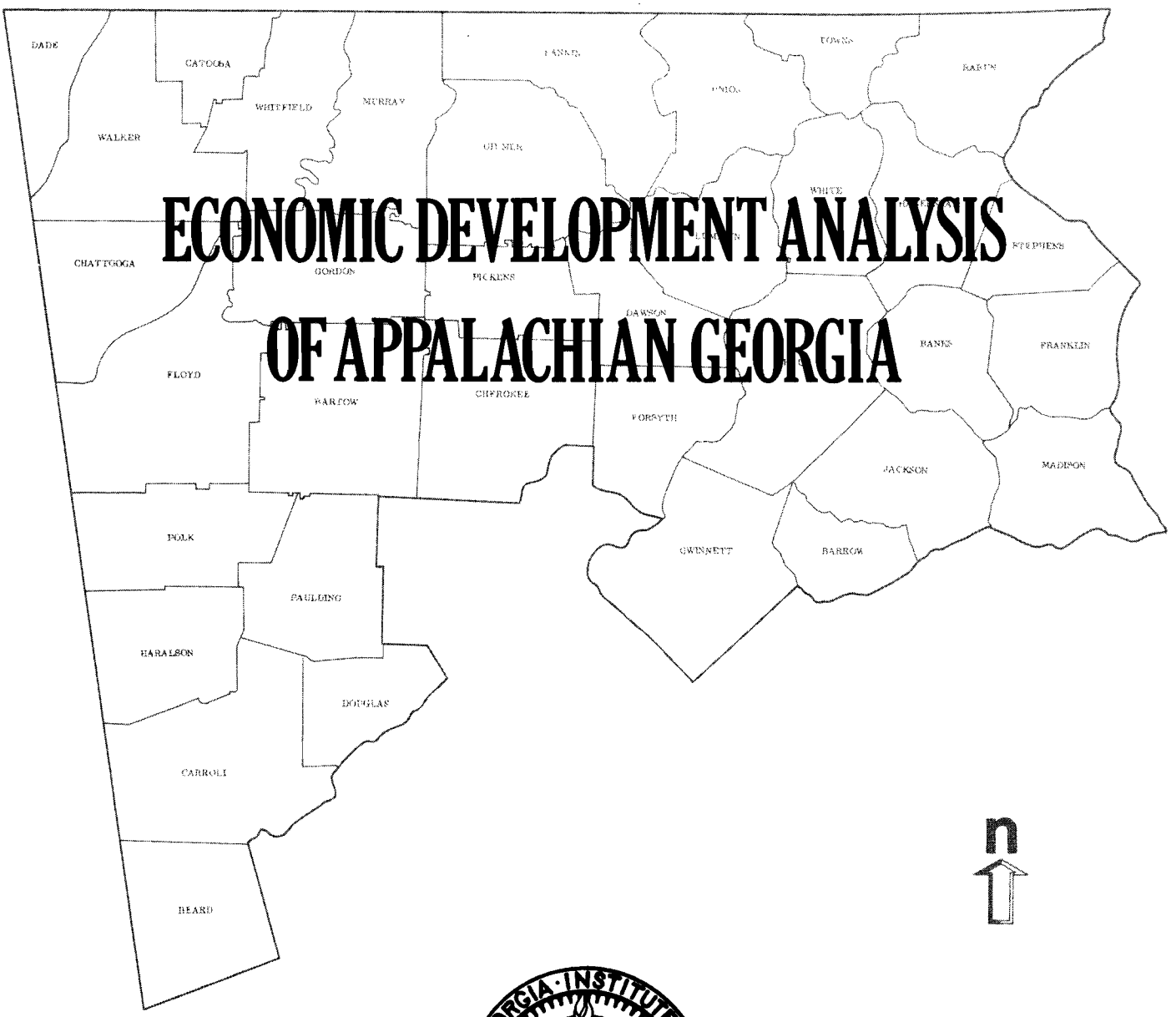

ECONOMIC DEVELOPMENT ANALYSIS OF APPALACHIAN GEORGIA

GEORGIA INSTITUTE OF TECHNOLOGY

Engineering Experiment Station
Economic Development Laboratory
Atlanta, Georgia 30332

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The research and analysis of data are designed to call attention of active and concerned citizens and of local development groups to strategies for achieving better utilization of human, institutional and natural resources. In the 35 counties of Appalachian Georgia, the study identifies growth trends, existing resources and some obstacles to further development. An analysis of the locational requirements of almost 450 manufacturing industries, along with desirability factors, is provided, together with an analysis of nonmanufacturing endeavors which appear most suitable and compatible with the region.

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ECONOMIC DEVELOPMENT ANALYSIS

OF APPALACHIAN GEORGIA

by

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PREFACE

This study was conducted for the Appalachian Regional Commission under a grant (GA-6397-78-I-200C-0614). The judgments and conclusions in this report are those of the authors, and do not necessarily reflect the views of the Appalachian Regional Commission, or of other agencies of the United States Government.

Robert B. Cassell and David S. Clifton are responsible for the overall development of the study, and the general format for presentation of the research findings. Chapters were contributed on resources by Robert B. Cassell and Kathryn W. Finkelstein; on transportation by M. John Moskalusk and James W. Marks; on water systems and wastewater treatment plants by B. William Riall; on industrial land availability by Winfred G. Dodson; analysis of manufacturing opportunities by Robert B. Cassell and David S. Clifton; analysis of non-manufacturing opportunities by B. William Riall; and development effort and application of the screening results by Robert B. Cassell. The publication was typed by Ila E. Benson. In addition, basic research contributions were made by Eric O. Berg, Jr.; Charles Cook; Frank P. Coyle; Sallie G. Daniell; William C. Darley, Jr.; and Dennis G. Keener.

Appreciation is expressed for the support and suggestions made by Phil W. Whitlow, Appalachian Economic Development Coordinator in the Georgia Department of Community Affairs, and to ARC staff members Michael A. Potterf and Carolyn Dempsey. Staff members of the North Georgia Area Planning and Development Commission, headquartered in Dalton, particularly Edward Butler and Larry F. Harrison, furnished valuable inputs.

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INTRODUCTION

In order to assist the Appalachian Regional Commission to formulate an Enterprise Development Program for possible inclusion in the Appalachian Georgia State Development Plan, a grant was made in 1978 by ARC to Georgia Tech's Economic Development Laboratory and to the North Georgia Area Planning and Development Commission. This analysis is one of the results of that research.

Enterprise Development is a process involving many kinds of organizations and numerous publics in the 35-county area of Georgia. Among these are existing business and industry, governmental agencies, public and private special interest groups. Enterprise Development processes involve interaction between and among these sectors with the ultimate purpose of improving the infrastructure and supporting investments which can lead to expansion of the economic base, attraction of additional employment, and improvement in the quality of life.

Special attention has been paid in this analysis to evaluating the human and natural resources which the Region posesses, and to identifying barriers to further sound economic growth. This study examines in separate chapters: the population and employment, labor force, educational and institutional resources directly bearing upon the job generation process; a wide spectrum of transportation resources and their likely future development; water systems and wastewater treatment facilities; industrial land reserves with attention to future demands; the effectiveness of local development efforts. These are basic to the presentation of an identification system of investment and growth opportunities in both manufacturing and non-manufacturing which can be capitalized upon in the Region. This identification process, based upon an impartial and scientific analysis, screens economic sectors for the types of activity which appear most feasible and have the most desirable characteristics or effects.

The research and the analysis presented herein are intended to assist those active and concerned citizens and groups in Appalachian Georgia to achieve better

utilization of human, institutional and natural resources. It also should provide guidance for individuals and organizations outside the Region but intimately concerned with the well-being of that section of Georgia.

EXECUTIVE SUMMARY

This examination of the human and natural resources and identification of the barriers to strong economic growth of the 35 counties in Appalachian Georgia reveals the following conditions:

The Region's population growth has exceeded rates for both the State of Georgia and the United States over the last two decades. This growth is projected to grow between 1970 and 2000 at an increase of 92%.

The Appalachian Region has had 55% of its total employment accounted for by manufacturing, a much higher percentage than prevalent either in Georgia or the United States.

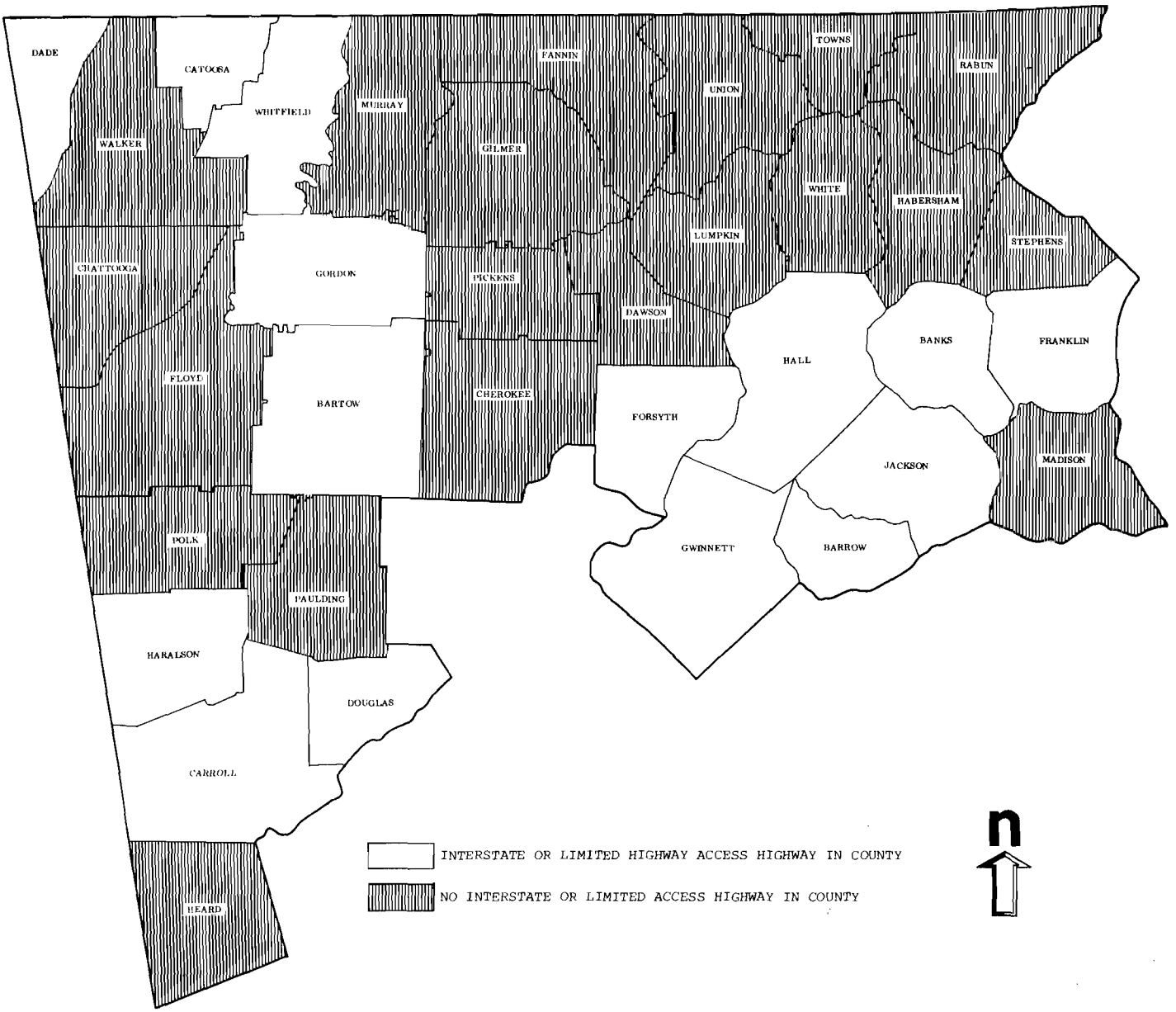
The labor force is dominated by blue-collar employment. Both labor force participation rates and estimates of labor availability indicate that no shortages of labor presently exist in the area, with over 58,000 persons considered available for employment.

Manufacturing employment is highly concentrated in three industrial groups: textiles, apparel and food. Diversification of the manufacturing base thus becomes obvious.

Forest resources and a variety of minerals are present throughout the area. These, however, have not been utilized to any significant degree for processing or related industrial operations.

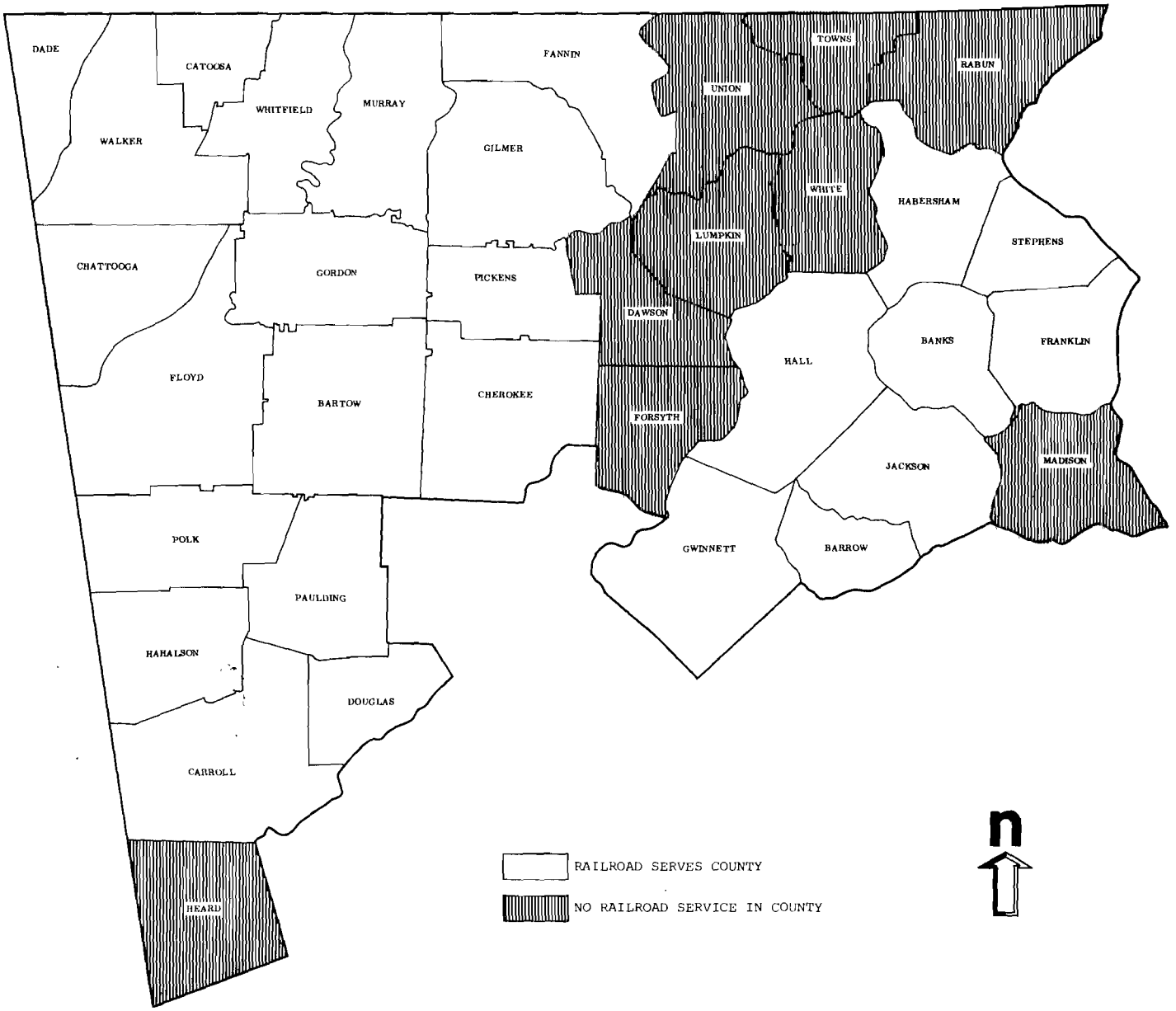
Transportation resources in the area are most highly developed in the northwestern and northeastern sections of the Region. Major highway routes (interstate and limited access) form three corridors from the Atlanta hub. (See Summary Figure 1). A series of wide and less restrictive corridors reflect the location of railroad service. (See Summary Figure 2).

Other transportation facilities, including bus lines, gas and oil pipelines, and the location of airport facilities reinforce this pattern. (See Summary Figure 3).



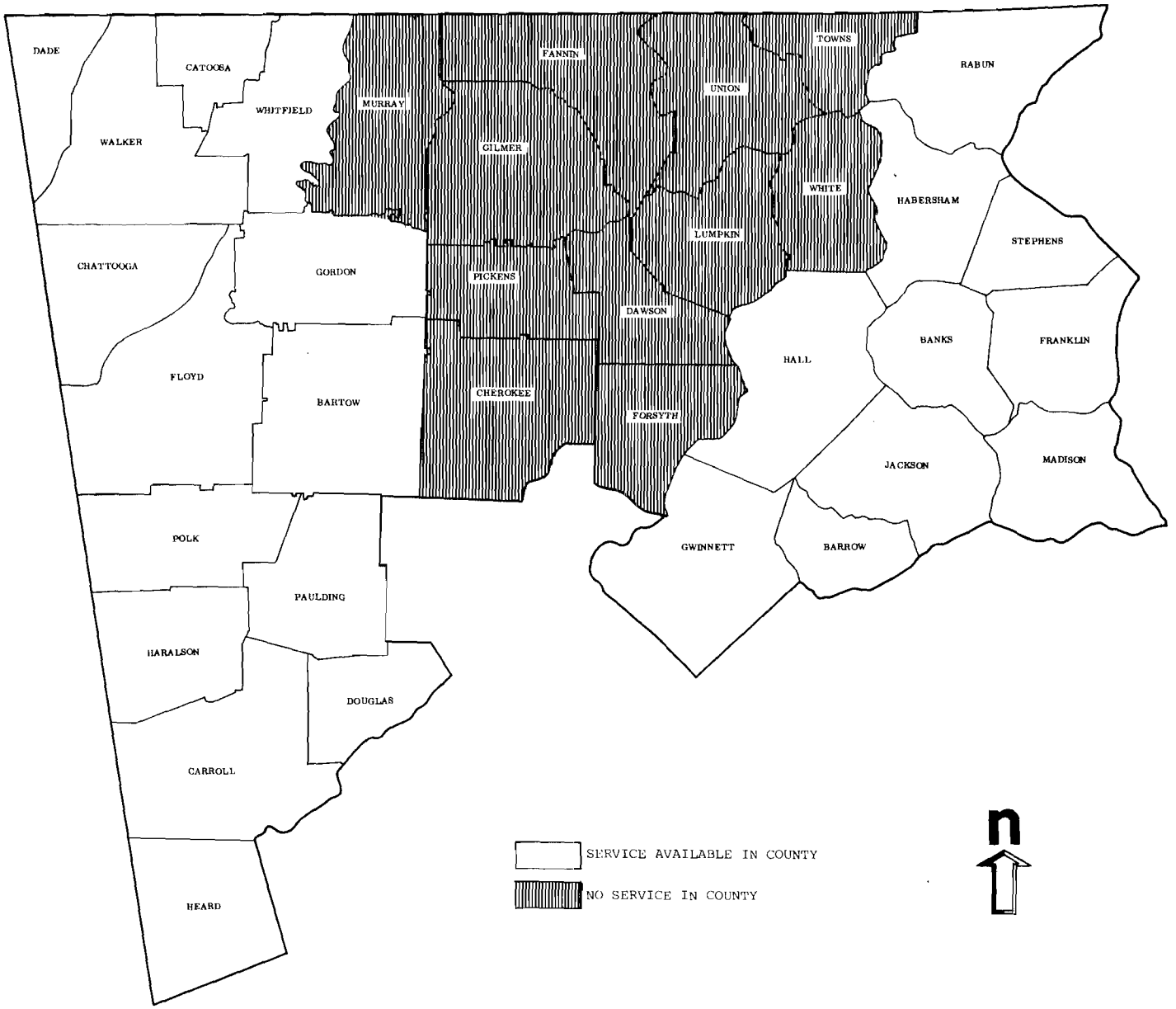
SUMMARY FIGURE 1

INTERSTATE/LIMITED HIGHWAY ACCESS



SUMMARY FIGURE 2

RAILROAD SERVICE



SUMMARY FIGURE 3

INTERCITY BUS SERVICE

Localities with substantial water available for population increases and further expansion of business activity are scattered through the Region. However, many local systems are unable to take on additional demands without substantial expansions of their systems. (See Summary Figure 4).

Wastewater treatment facilities can represent a major carrier to expansion of industrial activity. Only a few counties can accommodate industries with large waste loads. (See Summary Figure 5). By contrast, a number of local systems, in addition to those which already have priority for upgrading, need improvement. It appears that data on capacity of systems needs further input and analysis.

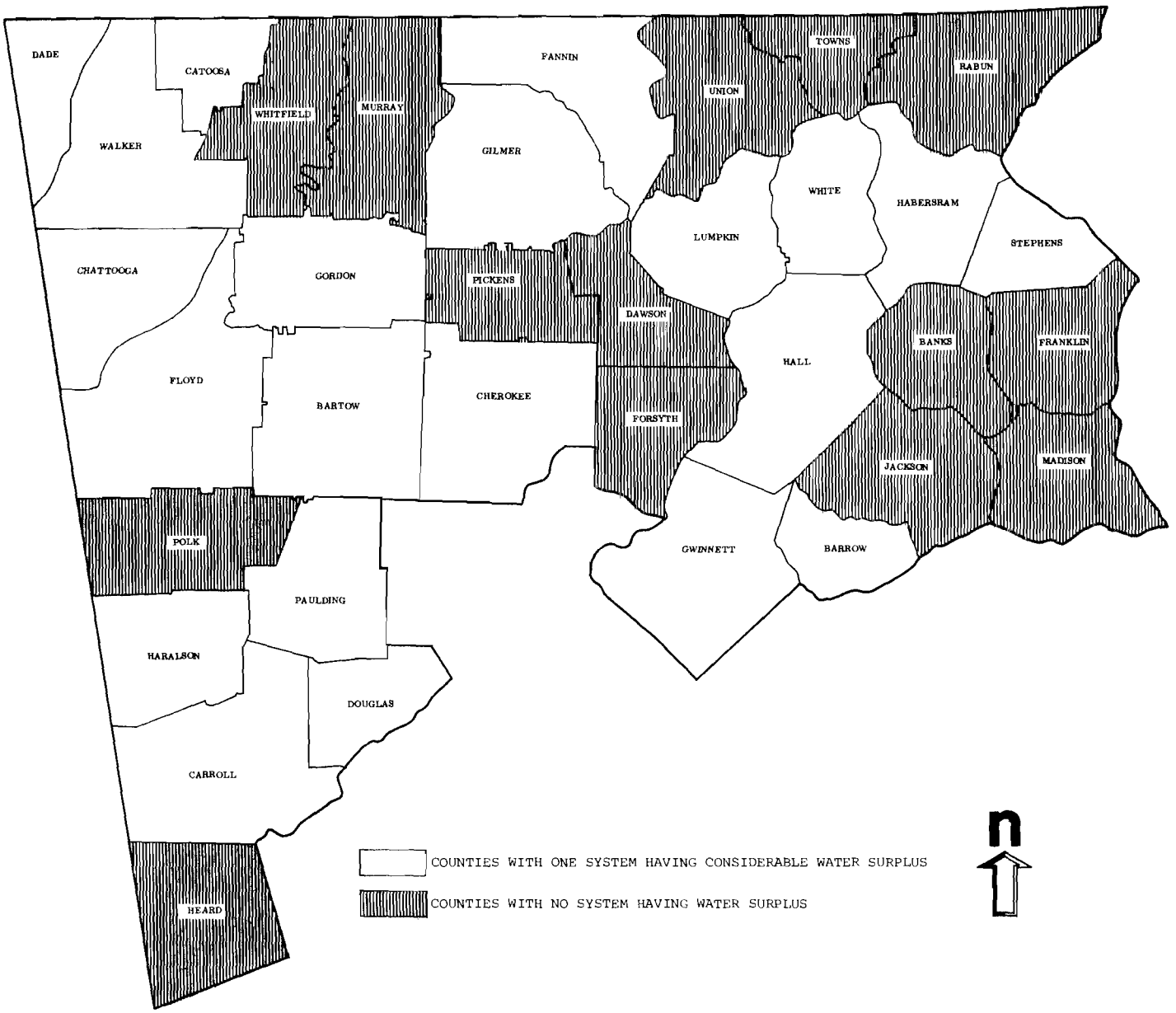
The industrial land situation in Appalachian Georgia appears adequate, at least for the next ten years. Only in a few cases are shortages anticipated. A system is provided for continuing measurement of the absorption of industrial land, based upon anticipated growth trends.

Natural gas availability is somewhat limited in the Region, and tends to be restricted largely within those same corridors which are evidenced in the highway and rail accessibility analyses. (See Summary Figure 6).

Local development efforts must be considerably upgraded if the job creation and investment expansions which are required over the next decade can be achieved. Only six counties have development organizations that are considered adequate and competent. (See Summary Figure 7).

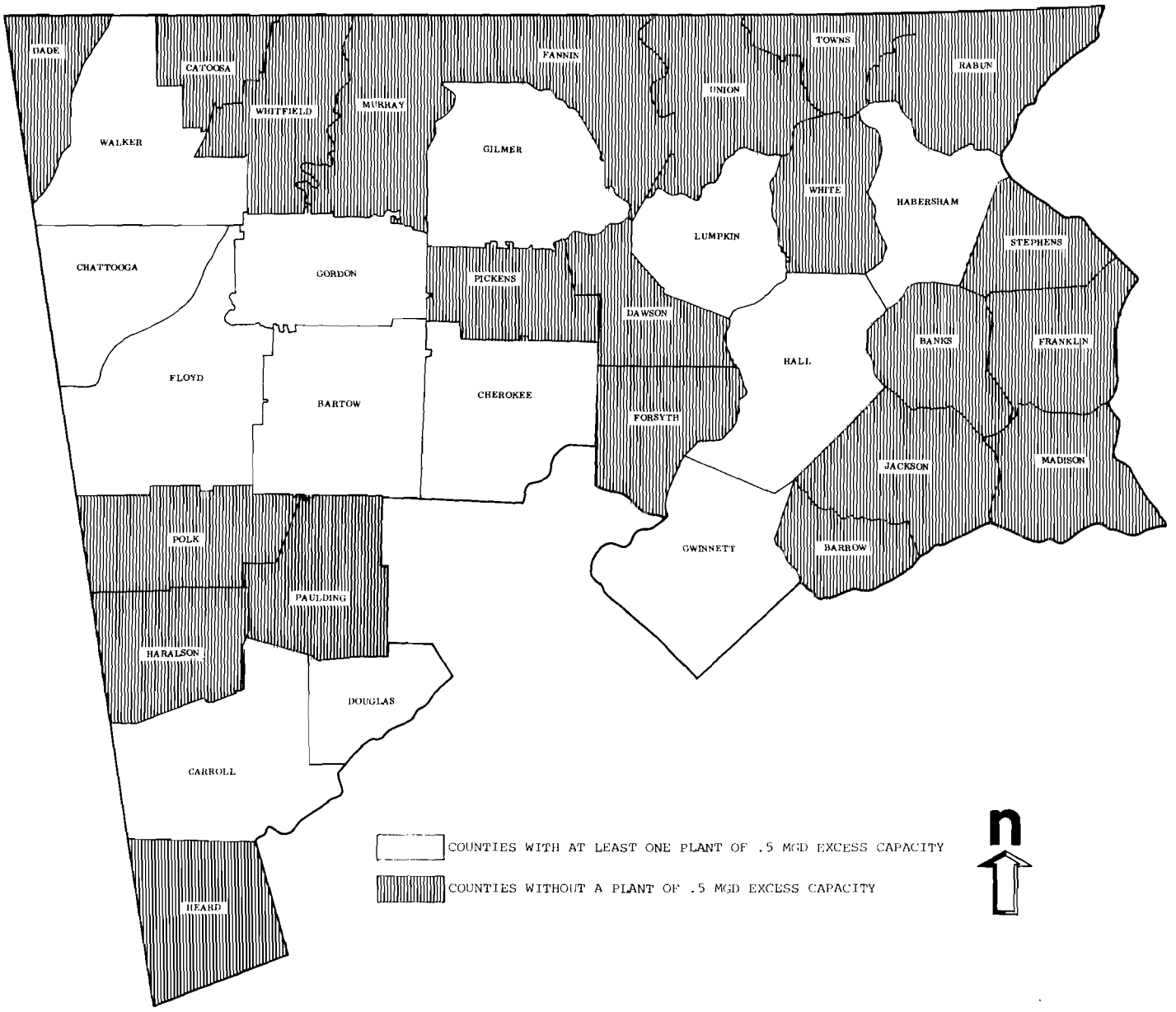
In a cursory, summary fashion, an indicator of the level of economic activity among the various counties can be determined from a ranking based upon per capita income, as shown in Appendix Table 4. Several of the counties in the top quartile are within the immediate orbit of the Atlanta metropolitan area. (See Summary Figure 8).

An analysis has been made of the location requirements of 448 industrial groups (at the four-digit SIC code level) combined with the desirability aspects of certain of those activities. The results of this screening



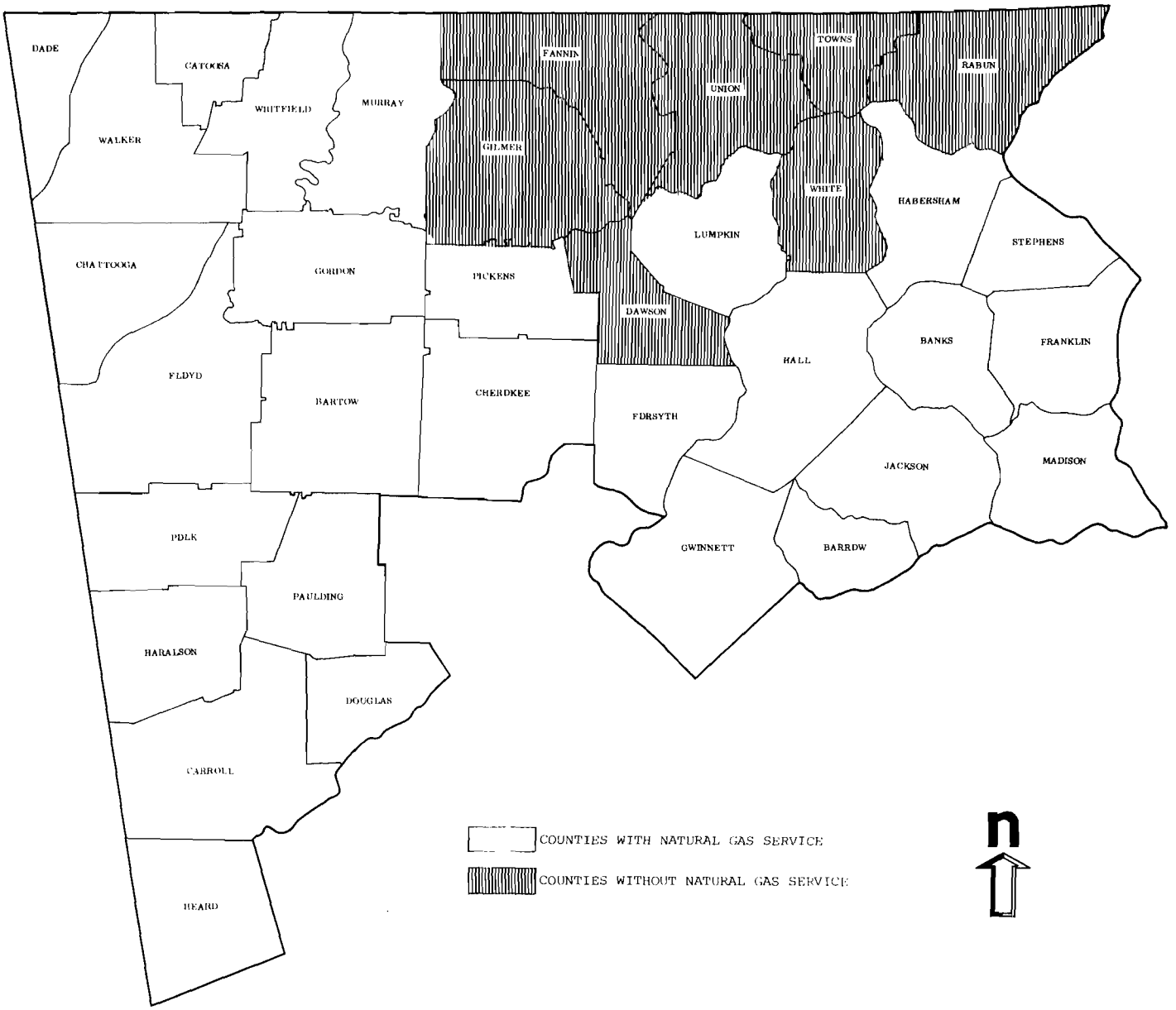
SUMMARY FIGURE 4

WATER CAPACITY



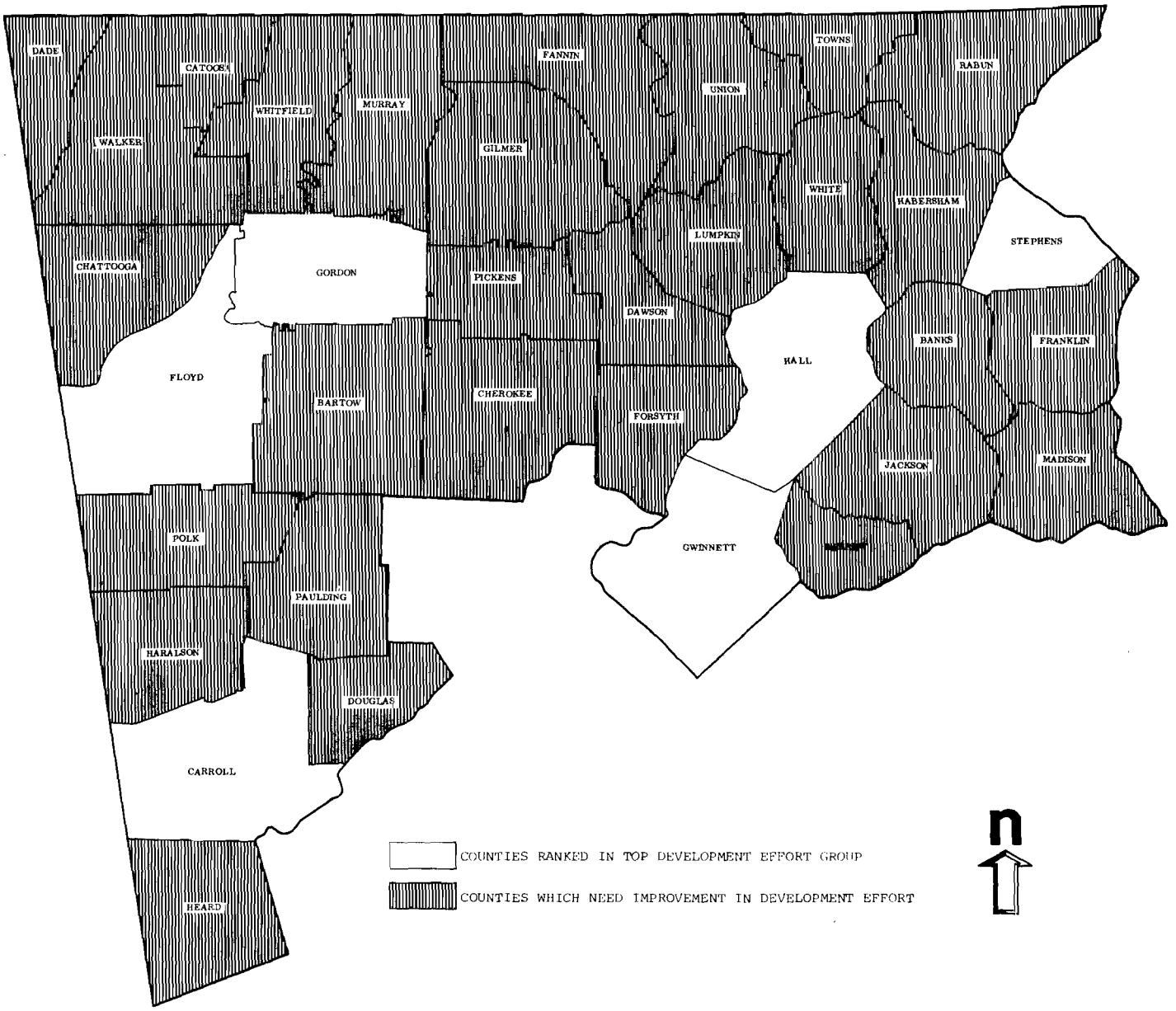
SUMMARY FIGURE 5

WASTEWATER TREATMENT CAPACITY



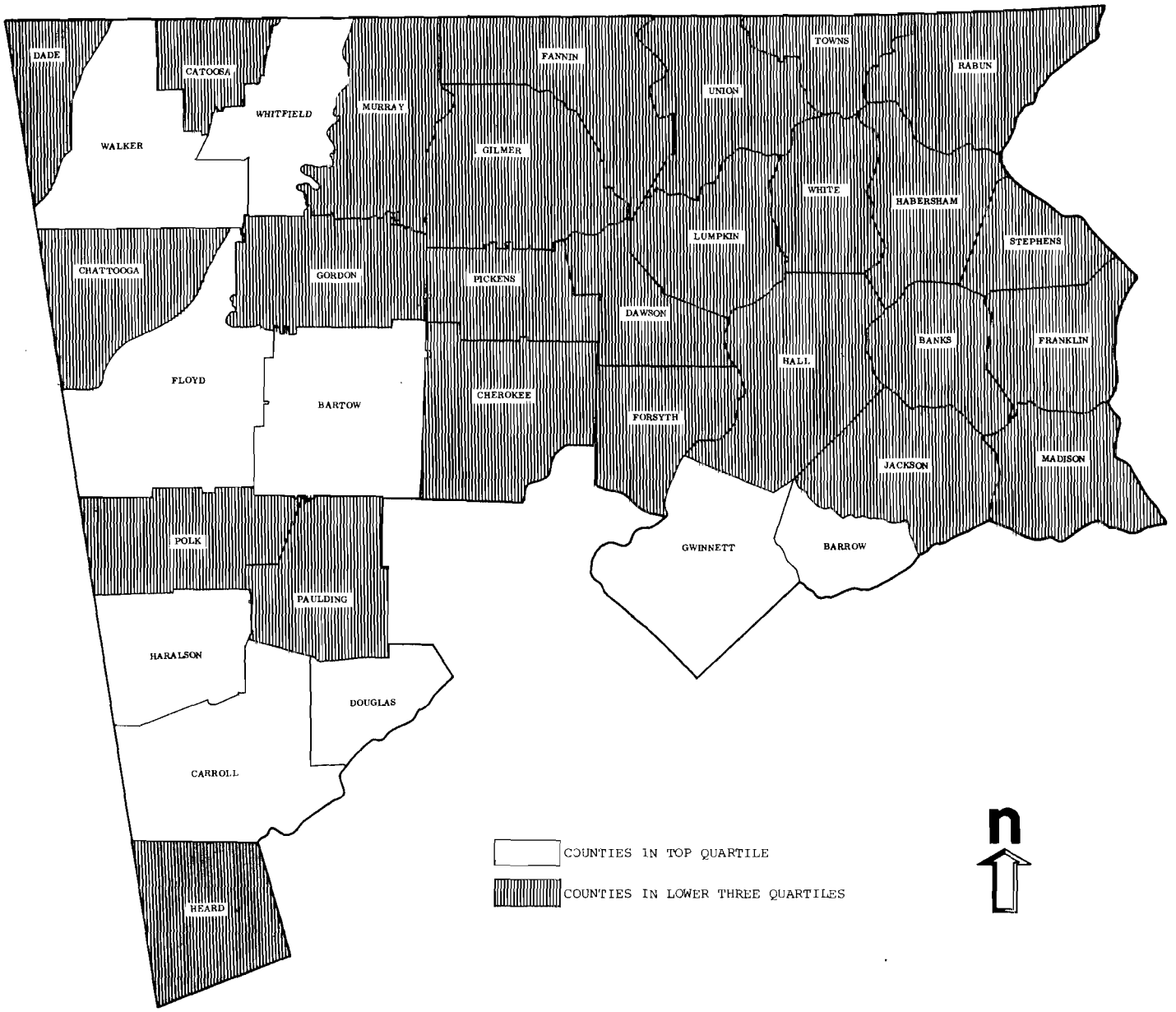
SUMMARY FIGURE 6

NATURAL GAS



SUMMARY FIGURE 7

DEVELOPMENT EFFORT



SUMMARY FIGURE 8

LEVEL OF ECONOMIC ACTIVITY
(Based on per capita income)

process identifies a total of 51 categories which have the highest feasibility/ desirability match with the Region.

An analysis has been made of non-manufacturing activities in efforts to identify gaps in the local economy. Identification of such groups at the two- digit level is made for 29 counties.

The potential for future economic development within the 35-county area can be evaluated in a subjective manner based on the data presented in this report. Counties with the greatest potential appear to be Carroll, Floyd, Gordon, Gwinnett, Hall, and Stephens. On the other hand, a number of counties face barriers to growth which will require substantial action to offset many obstacles. Based on the information provided in this report, an investment strategy can be formulated to achieve sound and healthy economic growth within the Appalachian Georgia Region.

Some general recommendations for a positive growth strategy emerge. More concerted efforts ought to be made to strengthen the caliber of local leadership through technical assistance and information sharing. Procedures for determining industrial land requirements are suggested. Upgrading of the Region's educational standards and increasing the skills of the labor force will broaden the appeal of the area for new and diversified economic activities. The initiation of comprehensive community development programs which will emphiasize upgrading of community liveability qualities and expanding of cultural amenities should reinforce certain of these programs.

RESOURCES OF THE APPALACHIAN REGION OF GEORGIA

A realistic analysis of current status of the Appalachian Region of Georgia is necessary in order to define enterprise development strategies for the region. This chapter brings together data on the human, natural, and institutional resources of the thirty-five counties so that such an analysis can be made. In order to present a comprehensive picture of the study area, a wide range of information is presented, including data describing the conditions which exist in the area now and potentials of the area that might be tapped in the future.

For the purposes of this examination, the data presented in this chapter are viewed in relation to those for larger geographic units. Several questions that must be answered in order to make the conclusions meaningful are: how do the resources of the study area compare with those of Georgia in general and with national averages; what are the economic development advantages and disadvantages of this Region compared to other areas of the state and of the country; what trends can be discovered by examining how resources in the study area have changed over time; and how do these trends compare with what has been happening elsewhere.

Most of the economic indicators underscore the growth which has taken place in the region. However, growth is a relative measure which can be viewed in several aspects. Also, the Region's resources, obviously, are not evenly distributed, and any economic development planning process must take these conditions into account. Therefore, the resource information is analyzed to determine those elements which the respective counties of the Georgia Appalachian Region have in common, as well as how they differ among themselves.

Human Resources

Included in the human resource analysis are data concerning the population of the study area, especially those characteristics of the population that describe people as workers or potential workers, and measurements of employment activities.

Population by Age and Sex

In 1976 the resident population of the Appalachian Georgia Region was estimated at 977,300, and projected to amount to 1,109,500 by 1980.[1/] At the last actual count (the 1970 census), the ratio of males (396,710) to females (416,886) did not differ significantly from the ratios for the state and the nation. The Region has a younger population than the nation, both in the under-5 age group, and the 25-to-34-year-old group, and a smaller than national share of the 65-and-over group. Compared with Georgia, the Appalachian Georgia Region has significantly smaller percentages of population in the five-to-19-year-old and 20-to-24-year old groups.

Population Growth and Projections

Comparision of population changes, based on census data, indicates that in the 1950's the population of the Appalachian Georgia Region was growing more slowly than the population of the state or the nation. However, this trend reversed itself in the next decade, and by 1970 this region was growing faster than the state as a whole and considerably faster than the nation. (See Figure 1).

Projections for the rest of the century indicate that the overall population growth of the nation between 1970 and 2000 will be 21%, while the growth for Georgia is projected to be 54% and for the Appalachian Georgia Region 92%. (See Appendix Table 1). This substantial difference will be due in part to the changing migration patterns within the United States. From 1970 to 1975, net migration into nonmetropolitan areas was greater than in United States metropolitan areas. Over the same period, net migration was 4.2% in the South and West, but -1.4% in the Northeast and -1.6% in the North Central states. The Appalachian Georgia Region, centered in the growing South and largely nonmetropolitan, has benefited from both migration trends. Although the rate of population growth is expected to slow down throughout the United States, current forecasts indicate that the study region should continue to grow faster than the state as a whole and considerably faster

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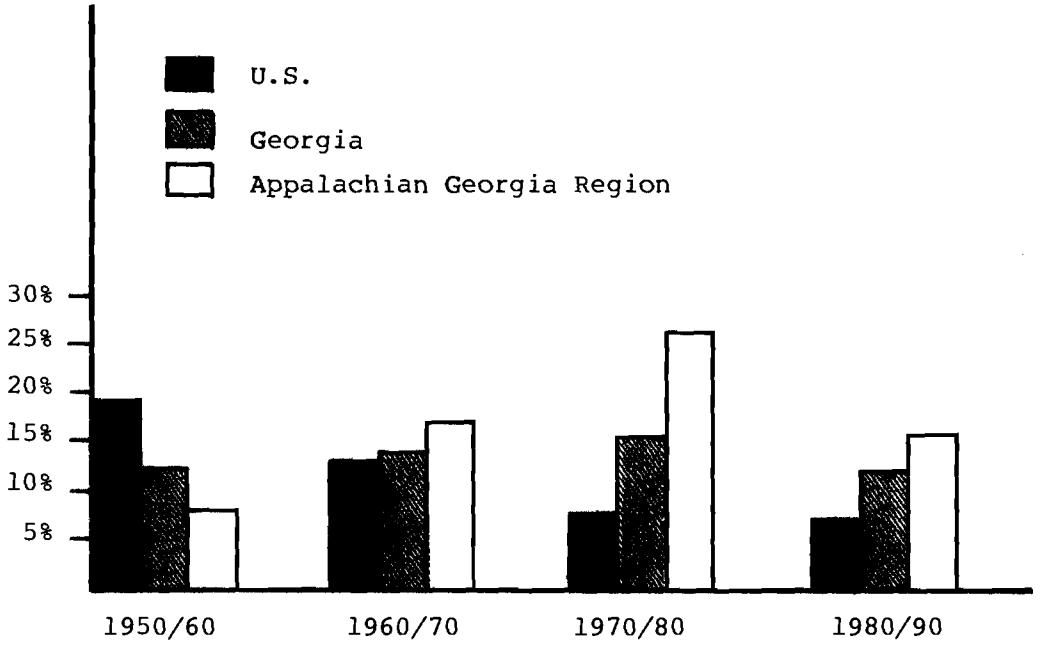
1/ Georgia Office of Planning & Budget, "Population Projections for Georgia Counties 1980-2010" (1977).

Figure 1

PERCENTAGE CHANGE IN POPULATION



Source: U.S. Bureau of the Census; Georgia Office of Planning & Budget

than the nation through the end of this century, and should reach 1,562,000 by the year 2000.[2/]

Employment

Since 1950, the Appalachian Region of Georgia has obtained more employment opportunities in manufacturing than in any other economic sector. Current data tend to support the assumption that this area provides more employment in manufacturing pursuits than any other geographic division of Georgia, excluding the four major urban centers.

Total employment has steadily increased in the Region since 1966, with a percentage increase by 40.5% being achieved between 1966 and 1976. Total employment increased in Georgia by 34.3%, and in the U. S. by only 23.5%. At least 224,000 persons in the Appalachian Region were gainfully employed in 1976.

Manufacturing employment is quite dominant in the study area, accounting for 55.9% of all employment in the Region in 1976. By contrast, manufacturing employment represented only 33.2% in the state and 30.3% in the nation. (See Figure 2). However, ten years earlier manufacturing accounted for an even larger proportion of total employment -- 62.7%. (See Appendix Table 2).

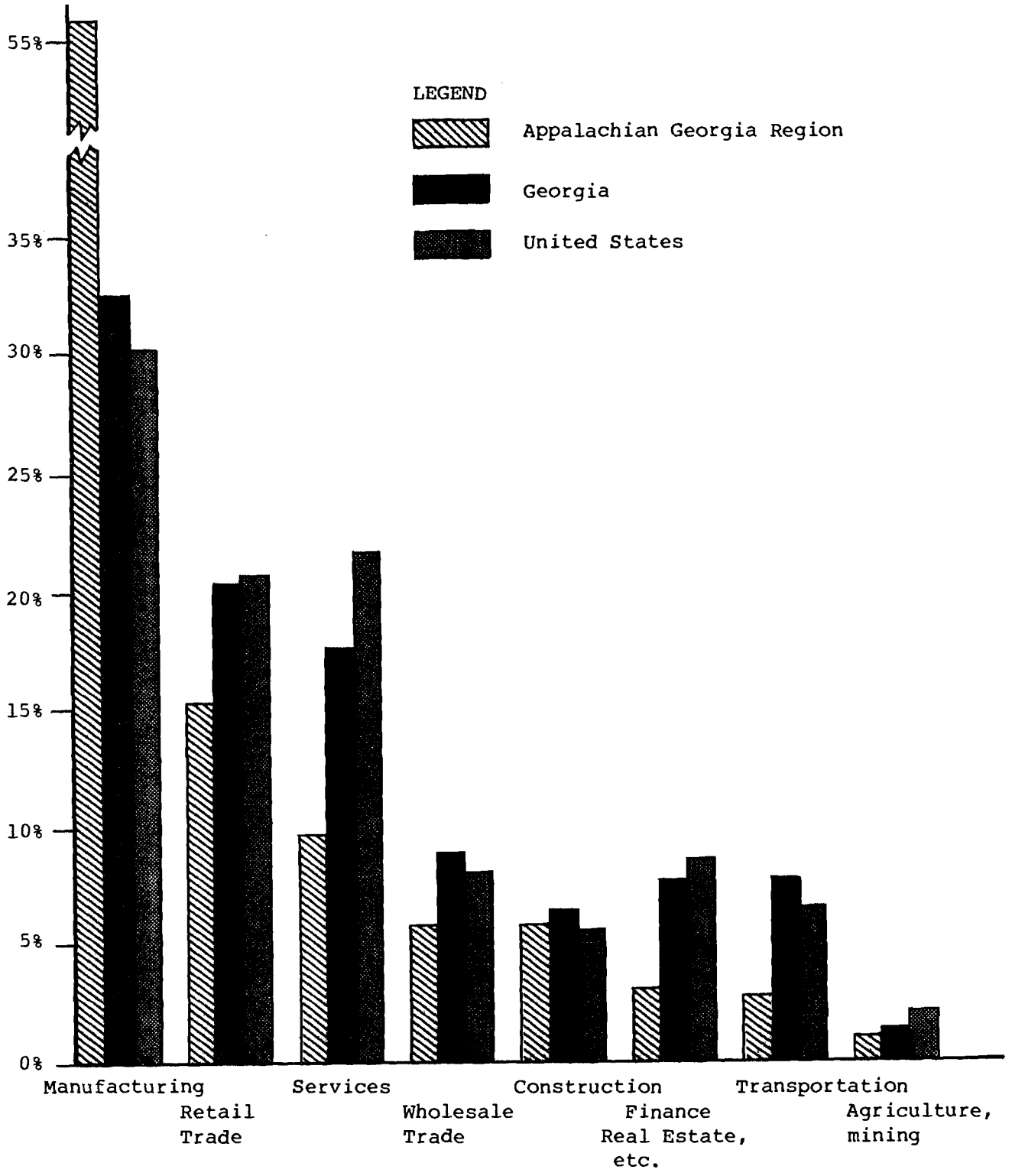
It may be too early to ascertain whether this is a short-term phenomenon or a long-term trend, as this major sector recedes from its predominant role, but still total manufacturing employment within the Region increased by some 26,500 persons over the ten-year period. This represents a 26.7% increase, whereas the state only registered a 13.9% increase, and the nation 1.0% in the same period.

A significant share of the difference in total employment was taken up by service activities increasing its share by 2.8%, retail trade by 2.2%, and wholesale by 1.9%. These three segments, growing substantially in the Appalachian Georgia Region, registered employment increases in the 1966-76 period ranging from 228% for wholesaling to 27% for services.

2/ Georgia Office of Planning & Budget, op. cit.

Figure 2

PERCENT EMPLOYMENT BY INDUSTRIAL SECTOR, 1976



Source: U. S. Bureau of Census, County Business Patterns, 1976.

Occupation of Employed Persons

Blue-collar occupations dominated the Appalachian Georgia Region in 1970, accounting for more than half the total jobs -- at least 55%. Next were white-collar jobs, representing 33% of the employed persons.

Both Georgia and the U. S. had a significantly greater proportion of white-collar workers and a lower proportion of blue-collar workers, a reflection of the above-average concentration of manufacturing employment in the study area. (See Table 1).

Table 1

OCCUPATION OF EMPLOYED PERSONS
1970
(by percent)

Occupation	Appalachian Region	Georgia	United States
White Collar	33	44	48
Blue Collar	55	40	36
Farm	3	4	3
Service	9	13	13

Source: U. S. Bureau of the Census, 1970 Census of Population

In order to examine the employment structure of the Region in another light, employment was divided by major Standard Industrial Classification (SIC) groups into two categories: those which constitute a "value created" and those which transfer a "value circulated." In the value created production group are agriculture, mining, construction, and manufacturing. (See Appendix Table 3 for value added by manufacture). In the value circulating group are all other SICs. Value created employment as a percent represented 62.5% of the total in the Region, compared to 39.8% for the State. If, however, urbanization patterns follow normal trends, the Region can anticipate a percentage rise in value circulating industries.

Labor Force Participation

The labor force participation is the ratio of the number of persons in the labor force to the total population of persons 16 years of age and over. The participation rate can be viewed as the relationship of the size to the population of an area. For example, an area may have a very high population compared with other areas, but if the participation rate is low, there may actually be a smaller labor pool to draw from that in areas with a smaller population but higher participation.

The 1970 labor force participation rates for the Appalachian Region were somewhat lower than those for either the state or the nation. (See Table 2). However, twelve counties in the Region exceeded the Georgia average, led by Whitfield and closely followed by Gwinnett, Stephens, and Gordon. Largest male participation rates were reported by Gwinnett and Whitfield, largest female participation by Stephens, Whitfield, and Haralson.

Table 2

LABOR FORCE PARTICIPATION RATES BY SEX AND AREA
1970
(by percent)

	Male	Female	Total
Appalachian Region	75.0	40.5	57.4
Georgia	77.9	44.7	60.5
United States	76.6	41.4	58.2

Source: U. S. Bureau of the Census, 1970 Census of Population.

The labor pool of an area may be raised by increasing the labor participation rate. At first glance, this would seem to be a difficult task in the study area. However, with current trends of lower college enrollments and greater numbers of women seeking to enter the labor force, it is possible to increase the participation rate. In addition, the dynamic effect of new jobs in an area, particularly in relatively high-paying jobs, will draw into the work force people who had not been participating because the available jobs were not considered to be sufficiently attractive.

Labor Availability

While labor force participation rates are useful in an analysis of the Region's labor pool, a more practical measure is the labor force availability as measured in estimates of recruitable labor made by the Georgia Department of Labor Employment Security Agency. These indicate that in May 1979 the Region had over 58,000 persons who were considered available for employment. This total includes 57,000 experienced non-farm workers and nearly 2,000 inexperienced workers; in addition a total of 11,000 high school graduates was reported, with a substantial proportion of these expected to enter the labor market for the first time.[3/]

These estimates do not necessarily represent the total number of workers available for attractive job openings, since other trainable workers could be recruited from housewives, farm laborers and students currently not in the labor market.

The unemployment rate statewide in August 1979 was reported at 5.5% of the civilian labor force. The unemployment rate in the Appalachian Region was probably in the same neighborhood, since both textile manufacturing and food processing were reported to be up slightly over the comparable month of 1978, and apparel manufacturing was at about the same level. As these represent the largest industrial activities in the Region, it can be assumed that unemployment was very likely tracking the state percentage.

3/ Georgia Department of Labor, Employment Security Agency, "Recruitable Labor in Georgia," August 1979.

Personal Income

Personal income includes all earned income (salaries, wages, dividends, interest, rent, tips, etc.) and transfer payments, such as unemployment, veterans, and social security benefits. Total personal income is the aggregate of these before taxes. Per capita personal income is total personal income divided by total population, providing an average income for each individual. While total personal income is generally regarded as a good measure of an area's economic activity, per capita personal income is considered the best single measure of an area's standard of living.

Among the thirty-five counties of the Appalachian Georgia Region, total personal income varies considerably. In 1975, Gwinnett County (actually part of the Atlanta metropolitan area) had total personal income of $654 million, while Towns County on Georgia's mountainous north border accounted for only $15 million. Counties which had over $200 million in personal income in 1975 include Carroll, Douglas, Floyd, Gwinnett, Hall, Walker, and Whitfield. (See Appendix Table 4).

While 1975 per capita personal income for Georgia as a whole was only 86% of the national figure, per capita personal income in the Appalachian Georgia counties was even lower than the Georgia average, with the sole exception of Gwinnett. Lumpkin, Rabun, Towns, and Union counties had per capita personal incomes which fell below 60% of the national average, while the Appalachian Georgia Region as a whole averaged 77% of the national figure.

Large numbers of low income families may affect the total economy of an area in many adverse ways, some obvious and some hidden. While the percentage of families below the poverty level in Georgia (17%) is greater than that for the nation (11%), the counties in the study area differ widely in poverty rates. Only Gwinnett County has a poverty rate below the national percentage, but over half of the study area counties have rates that are lower than the state percentage. Dawson, Lumpkin, Towns, Union and Gilmer counties have poverty rates of over 25% and together with their neighboring counties in the Northeast corner of the state, form the cluster where poverty in the Appalachian Georgia Region is most concentrated.

Income Sources

Income sources from manufacturing in the Appalachian Georgia Region place that activity as the top economic endeavor in at least 19 counties, based upon unpublished data compiled by the Bureau of Economic Analysis, U. S. Department of Commerce. These data indicate that in 1975 over 45% of labor and proprietors' income derived from this single activity. Since disclosure restrictions make it impossible to allocate all income in some instances, a ranking of the importance of manufacturing has been prepared for 29 of the Appalachian counties. (See Table 3). Data are so incomplete that six of these counties cannot be included.

Table 3

MANUFACTURING AS PERCENTAGE OF

TOTAL LABOR AND PROPRIETORS' INCOME, APPALACHIAN COUNTIES

1975

High (over 60%)	Medium (45% - 60%)	Low (less than 45%)
Murray	Madison	Lumpkin
Chattooga	Walker	Fannin
Banks	Habersham	Franklin
Gordon	Polk	Pickens
Stephens	White	Hall
Whitfield	Rabun	Forsyth
Barrow	Jackson	Gwinnett
	Floyd	Paulding
	Carroll	Douglas
	Union	Towns
	Cherokee	
	Bartow	

Source: U. S. Department of Commerce, Bureau of Economic Analysis, unpublished data.

By contrast, the income contribution made by trades and services amounted to 15% or more of total income in nine counties. While the rankings for the contribution of manufacturing as an income source are not reversed, there are some striking relationships shown for certain areas, reflecting the dominance of one or two types of economic activity. (See Table 4).

Table 4

SERVICES AND TRADE AS PERCENTAGE OF

TOTAL LABOR AND PROPRIETORS' INCOME, APPALACHIAN COUNTIES
1975

High (over 35%)	Medium (25%-35%)	Low (less than 25%)
Towns	Lumpkin	Stephens
Douglas	Floyd	Bartow
Paulding	White	Banks
Franklin	Union	Pickens
Gwinnett	Polk	Gordon
Hall	Jackson	Carroll
Forsyth	Habersham	Madison
Rabun	Whitfield	Chattooga
Cherokee	Barrow	Murray
Fannin	Walker	

Source: U. S. Department of Commerce, Bureau of Economic Analysis, unpublished data.

Selected Indicators

Another way of viewing the relative position of the Appalachian Region of Georgia is to examine how its economy stacks up against that of Georgia and the Southeast. As Table 5 indicates, the Region contains some 19.4 percent of the

state's population and 18.6 percent of its employment. However, its share of wages of production workers, of value added and of new capital expenditures are all at higher percentages than the state or the Southeast.

A second set of indicators reveals that on a per capita basis, in five significant categories, the Region still lags the state and the southeast; in two, personal income and retail sales, its per capita status is slightly higher when compared with southeastern totals than compared only to Georgia.

Educational Resources

Educational attainment and educational institutions are important factors to be considered in analyzing the resources of an area. The educational attainment of the residents partially determines their ability to pursue productive careers, while the process of education stimulates the social development of the community. Within the Appalachian Georgia Region, formal education is available at all levels from kindergarten to college, including vocational-technical schools.

Educational Attainment

The level of adult educational attainment is significantly less throughout the Appalachian Georgia Region than in the state and the nation. In 1970 the percentage of the total population over twenty-five years old with high school education was 31% in the region, 41% in Georgia, and 52% in the U.S. Those completing four or more years of college totaled 5% in the study area, 9% in Georgia and 11% in the U.S.

There are 46 public school systems in the Appalachian Georgia Region, with a total average daily attendance in 1976 of 200,000 students in grades K-12. Overall, these systems received only 86% of the average Georgia school funding per child.

Vocational-Technical Schools

There are six public vocational-technical schools in the Appalachian Georgia Region with a total enrollment capacity of 5,240, including day and night students.

Table 5

SELECTED COMPARISON INDICATORS, APPALACHIAN GEORGIA REGION, GEORGIA, AND THE SOUTHEAST*

	AG Region as Percent of		Average Annual Percent Change		
	GA 1975	S.E. 1975	1970-1975 AGR	GA	S.E.
Population[1]	19.4	2.7	3.5	1.5	1.9
Employment[2]	18.6	2.7	5.8	1.5	2.4
Personal Income[3]	17.4	2.5	12.3	10.1	11.2
Wages of Production Workers[4]	26.3[a]	3.8[a]	8.9[c]	8.1[c]	9.1[c]
Market Value of Agricultural Products Sold[5]	23.6[b]	4.0[b]	8.3[d]	12.3[d]	11.4[d]
Value Added by Manufacture[4]	22.9[a]	3.4[a]	9.9[c]	9.5[c]	9.7[c]
New Capital Expenditure (Manufacture)[4]	23.7[a]	3.9[a]	10.4[c]	10.2[c]	6.3[c]
Retail Sales[6]	15.0[a]	2.2[a]	13.8[d]	11.0[c]	11.0[c]
Deposits, All Banks[7]	13.0	1.8	14.6	12.4	13.4
Per Capita Personal Income	89.6	91.5			
Production Wages per Worker	92.6[a]	91.3[a]			
Per Capita Retail Sales	76.9[a]	80.2[a]			
Per Capita Bank Deposits	66.8	64.8			
Value Added by Manufacture per Employee	81.0[a]	80.3[a]			

* Southeast: Kentucky, Tennessee, Mississippi, Alabama, North Carolina, South Carolina, Georgia, and Florida

[a] 1972 [b] 1974 [c] 1967-1972 [d] 1969-1974

Sources:

[1] U. S. Department of Commerce, Bureau of the Census, Poulation Estimates and Projections, Series P-25 Nos. 642 and 658.

[2] U. S. Department of Commerce, Bureau of the Census, County Business Patterns, 1970 and 1975.

[3] U. S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business, April 1973, April 1977, and August 1977.

[4] U. S. Department of Commerce, Bureau of the Census, Census of Manufactures, 1967 and 1972.

[5] U. S. Department of Commerce, Bureau of the Census, Census of Agriculture, 1969 and 1974.

[6] U. S. Department of Commerce, Bureau of the Census, Census of Business, Retail Trade, 1967 and 1972.

[7] Federal Deposit Insurance Corporation, Summary of Deposits in All Commercial and Mutual Savings Banks, June 30, 1970 and June 30, 1975.

Courses offered at the schools provide training for a variety of occupations in technical, skilled labor, business, and health fields. The schools and their locations are:

Carroll County Area Technical School, Carroll County
Coosa Valley Area Technical School, Floyd County
Lanier Area Technical School, Hall County
North Georgia Technical and Vocational School, Habersham County
Pickens Area Technical School, Pickens County
Walker County Area Technical School, Walker County

Junior and Senior Colleges

Six senior colleges and 8 junior colleges in the Appalachian Georgia Region have a current enrollment of over 15,000 students. A full range of liberal arts and occupationally-oriented courses is offered in the region; other outstanding colleges close by include the University of Georgia in Athens, Georgia Institute of Technology and Emory University in Atlanta. Colleges in the Appalachian Georgia Region include:

Private Colleges:

Berry College, Floyd County
Brenau College, Hall County (for women only)
Piedmont College, Habersham County
Shorter College, Floyd County

Public Colleges:

North Georgia College, Lumpkin County
West Georgia College, Carroll County

Private Junior Colleges:

Emanuel College, Franklin County
Reinhardt College, Cherokee County
Truett McConnell College, White County
Young Harris College, Towns County

Public Junior Colleges:

Dalton Junior College, Whitfield County
Floyd Junior College, Floyd County
Gainesville Junior College, Hall County

In addition to the schools listed, two special purpose institutions operate in the region: Toccoa Falls Bible College in Stephens County and Hall School of Nursing in Hall County.

Natural Resources

Like all resources, natural resources must be considered in development planning. While the configuration of resources existing in a given area may constrain development in some directions, it may encourage other kinds of development for which the area is well suited. For the most effective planning, it is necessary to look at both resources currently being utilized and resources neglected now which could be exploited in the future.

Forest Resources

The area of commercial forest land in the Appalachian Georgia Region had remained relatively stable during the 1960's, decreasing less than 3%, according to the latest U. S. Forest Service survey of Georgia's forest resources. However, there was less forestry activity in this area than in any other part of Georgia, due, in part, to the extensive National Forest preserves in the region. In 1971 growth of growing forest stock was twice as great as the volume of the stock that was removed. Among factors contributing to the low level of forestry activity were the fact that up to 30% of the commercial forest was situated on mountainous land; that hardwood species dominated more than half of the forested area; and that only 10% of the forest area was owned by or leased to the forest industry.

Forest statistics by county can be found in Table 6.

Mineral Resources

The Appalachian Georgia Region contains a richer variety of minerals with commercial potential than any other part of the state, but mining is an

Table 6

FOREST RESOURCES OF THE APPALACHIAN GEORGIA REGION
1972

	Percent of County in Commercial Forest	Volume of Sawtimber, Commercial Forest Land (million board feet)		Annual Removals of Sawtimber, Commercial Forest Land, 1971 (million board feet)	
		Pine	Hardwood	Pine	Hardwood
Coosa Valley APDC	N.A.	1425	1324	70	59
Bartow	66	284	156	8	2
Catoosa	52	43	123	2	10
Chattooga	75	150	108	10	1
Dade	72	28	128	3	8
Floyd	65	243	164	4	6
Gordon	39	128	88	5	7
Haralson	79	136	122	5	12
Paulding	81	187	139	22	9
Polk	64	133	98	8	10
Walker	64	94	199	5	5
Georgia Mountains APDC	N.A.	1782	2676	118	46
Banks	71	107	179	15	2
Dawson	83	58	167	31	2
Forsyth	63	169	37	20	1
Franklin	54	118	107	5	--
Habersham	77	236	227	7	3
Hall	60	148	183	22	10
Lumpkin	89	137	340	1	4
Rabun	90	315	320	5	28
Stephens	71	114	128	4	1
Towns	85	81	194	--	--
Union	83	144	539	7	4
White	64	154	255	2	--
North Georgia APDC	N.A.	1058	1527	59	--
Cherokee	81	284	150	18	7
Fannin	88	57	551	1	19
Gilmer	88	134	392	7	12

FOREST RESOURCES OF THE APPALACHIAN GEORGIA REGION (Cont'd)

	Percent of County in Commercial Forest	Volume of Sawtimber, Commercial Forest Land (million board feet)		Annual Removals of Sawtimber, Commercial Forest Land, 1971 (million board feet)	
		Pine	Hardwood	Pine	Hardwood
Murray	72	193	195	11	3
Pickens	84	142	98	19	--
Whitfield	60	250	142	3	1
Other Counties	N.A.	1367	1232	67	24
Barrow	49	65	143	10	2
Carroll	63	103	189	16	5
Douglas	75	75	160	3	--
Gwinnett	67	444	293	12	9
Heard	83	313	187	11	1
Jackson	67	218	121	14	1
Madison	59	150	140	3	7
Appalachian Georgia Region	N.A.	5633	6759	314	157

Source: U. S. Department of Agriculture, Forest Statistics for North Georgia and Forest Statistics for North Central Georgia, 1972.

insignificant portion of the area's economy. Although exact figures for mining employment are not available, because of disclosure restrictions, U. S. Bureau of the Census approximations for 1976 indicate that mining employed between 1,000 and 1,500 people in the Appalachian Region. In only three counties -- Gilmer, Pickens, Barrow -- were more than 100 persons employed in mining.

The following identification of minerals mined and processed is based upon U. S. Bureau of Mines data for 1975, updated where possible.

Barite. The Cartersville district in Bartow County accounted for all of Georgia's barite production in 1975. End uses for the processed barite included barium chemicals, fillers and extenders for rubber and paint, glass fluxing agents, drilling needs and mix for heavy concrete.

Clay. Bartow, Floyd, Polk, Walker, and Douglas counties produced clay in 1975. Floyd County was the largest producer, with two brick companies.

Coal. Firms in the study area produced a total of 332,000 tons of coal from strip mines in 1978. One firm in Chattooga County ships high-grade metallurgical coal to Brazil for use in steelmaking. Two others operate mines in Dade County, trucking the coal to Chattanooga for coking. No coal was mined in the study area between 1965 and 1975. The current need for energy sources may make coal mining an economically viable operation.

Mica. Micaceous material was produced in Cherokee County in 1975, though the output was decreasing. The mica was ground for use as a filler by the paint industry.

Sand and Gravel. These materials are produced in Douglas and Forsyth counties.

Stone. Most of the counties in the Appalachian Georgia Region produce stone, with the largest operations located in Banks, Bartow, Carroll, Douglas, Floyd, Gilmer, Habersham, Hall, Madison, Pickens, Polk, Stephens, Walker, and Whitfield counties. Among stone products from the region are crushed sandstone for use in cement, quartzite and sandstone flagging and crushed quartzite aggregates. The only producer of marble in 1975 operated two surface marble quarries in Pickens County and two underground operations, one each in Pickens and Gilmer counties. End uses

for the marble products range from dimension stone for structural and monumental applications to finely ground high-purity fillers for chewing gum and toothpaste. Slate is mined in Polk County for manufacture of expanded aggregates.

Talc. Georgia's only talc producer operates underground mines in Murray County. The ground talc is sold for use in rubber, asphalt, composition roofing, and various other products.

Water Resources

Geographically, the Appalachian Georgia Region can be divided into three provinces: Valley and Ridge section in the Northwest corner of the state (Walker, Catoosa, Whitfield, Murray, Chattooga, Floyd, Gordon and Bartow counties); Blue Ridge Mountain section of counties along the remainder of Georgia's north border and dipping down to include most of White and Lumpkin counties; and Piedmont section that includes the rest of the study area.

Water resources in each of the sections can be summarized:

Valley and Ridge. This section is notable for thousands of springs, which supply a significant portion of the water for public water supplies, rural water needs, and private industrial uses. In addition, abundant groundwater from wells is used for these purposes. Most of the towns and industrial centers in this section, with the exception of the Dalton area in Whitfield County, lie along streams or rivers that have large enough flows to meet future demands.

Blue Ridge Mountain. This section has little underlying groundwater and depends primarily on surface water to supply its needs. During periods of dry weather when stream flow is lower than normal, water from reservoirs must sometimes be used.

Piedmont. With water resources much like those of the Blue Ridge Mountain area, this section has only enough underlying groundwater to supply small local users. Larger public systems and industries depend on surface water. Storage facilities are often necessary to provide water during seasons of low stream flow.

The three major river systems that drain Georgia's Appalachian Region are the Coosa, the Chattahoochee, and the Savannah. All three are highly regulated by storage reservoirs and hydro-power plants.

Coosa River System. The Coosa River is formed at Rome where the Oostanaula River joins the Etowah. Major tributaries of the Oostanaula are the Ellijay River, originating in northern Gilmer County, and flowing into the Coosawattee River which, in turn, joins the Conasauga River near Calhoun to form the Oostanaula. The Etowah River originates in Lumpkin County and flows south and then west to its junction with the Oostanaula. Major flow regulators for the Coosa System are Carters Dam in Murray County, Allatoona Lake near Cartersville, and Weiss Lake across the Alabama border which creates pool conditions as far upstream as Rome. The average daily flows for major rivers in this system are 1,600 mgd (million gallons per day) for the Etowah two miles upstream of Rome, 2,200 mgd for the Oostanaula 4.5 miles upstream of Rome, and 4,000 mgd for the Coosa 2 miles upstream of Georgia's western border.

Chattahoochee River System. The Chattahoochee River and its tributaries, the largest of wh ich is the Chestatee River, are basically unregulated above Buford Dam and Lake Lanier on the Forsyth and Hall County border. Average daily flow for the Chestatee River near Dahlonega is about 200 mgd for the Chattahoochee River near Buford about 1,300 mgd.

Savannah River System. The headwaters of the Savannah River system are partly located in the Appalachian Georgia Region. The Chattooga River along the Georgia-South Carolina border is joined by the Tallulah River to form the Tugaloo River, which continues along the border. The Chattooga River has been designated a Wild and Scenic River, and, as such, is not regulated. The Tallulah River is regulated by Lake Burton and by a series of power plants. Average daily flow for the Chattooga River near Clayton is about 380 mgd and for the Tugaloo River near Hartwell 1,300 mgd.

Agricultural Resources

Agriculture accounts for less than one-half of one percent of all employment

in the Appalachian Georgia Region. There were 14,000 farms in the region in 1976, which was 20% fewer than there had been in 1969, but the value of agricultural products sold rose 30% during that time to $440 million. The most significant agricultural resources of the area are livestock, poultry, and their products.

Recreational Resources

The Appalachian Georgia Region is rich in recreational resources and its tourist industry employed a total of over 16,000 people in 1976. Especially noteworthy is the Chattahoochee National Forest which includes a large portion of the Georgia Mountains APDC and smaller parts of the North Georgia and Coosa Valley APDC's. Major outdoor recreation sites include the Chattooga River along Rabun County's eastern border, the Appalachian Trail from Rabun to Gilmer counties and seven lakes (Allatoona, Lanier, Carters, Blue Ridge, Nottely, Chatuge, and Burton).

Construction Industries

Construction industries employed 6% of all employees in the Appalachian Georgia Region in 1976, which was slightly smaller than the percentage for Georgia and about the same as that for the U. S. The counties with the greatest construction employment were Gwinnett, with over 3,000, and Floyd, Hall, and Whitfield with over 1,000 each.

Wholesale, Retail, and Service Trades

Wholesale, retail, and service trades employed close to 70,000 people in the Appalachian Georgia Region in 1976, or 30% of all those employed. This is much less than the national rate of almost 50% and the Georgia rate of 40% employed in these three sectors. These figures reflect the comparatively high employment concentration in manufacturing in the study area.

Energy Consumption

Comprehensive data on energy use are not available for individual counties, but the latest published data (1975) on energy use does supply information by Area Planning and Development Commission region. Coosa Valley APDC used 7% of

the total energy used in Georgia in 1973, while Georgia Mountains APDC used 4% and North Georgia APDC used 3%. In proportions of ultimate energy use supplied by various fuels, the three APDC's closely paralleled Georgia with 35% of its energy coming from gasoline, 30% from natural gas, 14% from electricity and 6% from diesel fuel. In distribution of ultimate energy use by sector, Coosa Valley and North Georgia APDC's differed sharply from the state as a whole in using more energy (35%) for manufacturing than the percentage (25%) used by the state. For the three APDC's combined, ultimate energy use by sector was distributed as follows: agricultural 2%, commercial 7%, manufacturing 32%, mining 4%, residential 15%, and transportation 41%.

Within the manufacturing sector most ultimate energy use came from natural gas (58%), followed by electricity (19%). The manufacturing industries using the most energy were textile mill products (58%), stone, clay and glass products (11%), chemicals and allied products (8%), paper and allied products (7%), and food and kindred products (6%).

TRANSPORTATION NETWORK

Highway System

For most people, the highway system is the most visible and the most utilized element in an area's overall transportation system. This is merely the reflection of modern society's dependence upon the automobile, especially for intercity travel. The existing system and planned expansion (to the year 2000) of major highways in the Appalachian Region[1/] is depicted in Figure 3.

The eastern and northwestern sections of the region are served well by the Interstate-85 and Interstate-75 corridors, as well as the feeder systems which cross them. In the west, Carrollton is served by Interstate-20 and US-27, but the surrounding areas are only served by local roads. Improvements are planned along the north-south corridor (US-27) in the western part of the state, including upgrading to four lanes and a bypass around Summerville in Chattooga County.

The central portion of north Georgia is generally not served as well by the existing system, especially in the Blue Ridge Mountains area. Highways which cross the Blue Ridge in this area are US 19-129, north of Dahlonega; GA-348 (Richard Russell Scenic Highway); GA-75, north of Helen; and US 23-441, north of Toccoa. Because of the mountainous terrain, these roads are circuitous, and often narrow with steep grades. Although passing lanes are being added on most of them, these conditions discourage tourists and make truck transportation difficult, resulting in isolation of many of the residents from jobs and vital services.

The Appalachian Regional Commission recognized this problem in Georgia and other parts of Appalachia by attaching importance to the construction of a development highway through the system. The Appalachian Development Highway in Georgia (State Route 400) is to enter the state from North Carolina near Young Harris in

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1/ Georgia Department of Transportation, Office of Statewide Systems Planning, Georgia Transportation Plan, 1978.

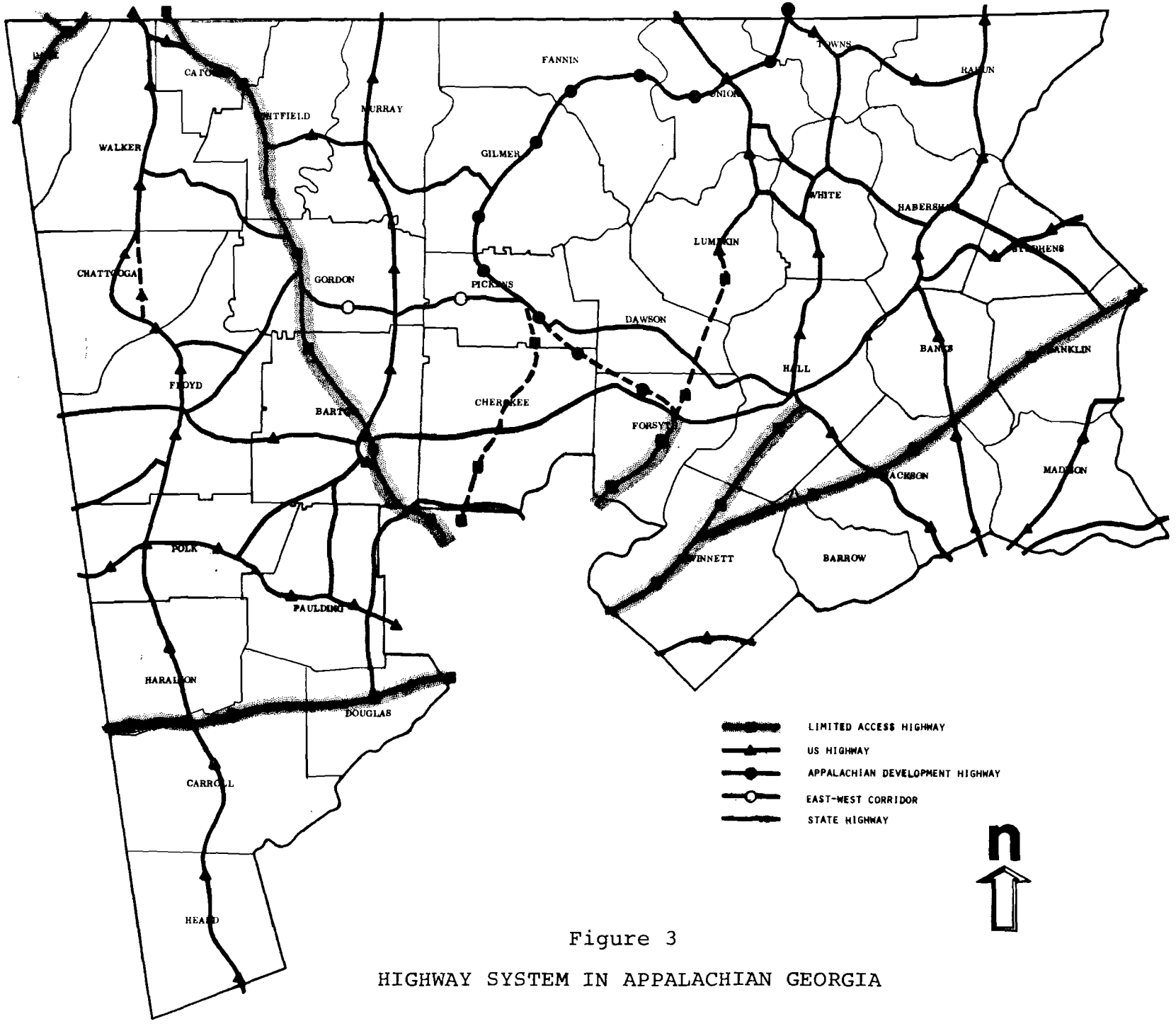

Figure 3

HIGHWAY SYSTEM IN APPALACHIAN GEORGIA

Towns County and terminate in Atlanta.[2/] The original alignment of this highway would have constituted a straight-line path through the area, requiring extensive new freeway construction and tunneling through the Blue Ridge at Neels Gap.

Another highway through the area proposed at about the same time was the Georgia segment of the Blue Ridge Parkway, which would have entered Georgia from North Carolina and followed the Blue Ridge through the Chattahoochee National Forest, passing south of Canton in Cherokee County before joining I-75 in northern Cobb County.[3/] As proposed, this highway would have traversed many environmentally sensitive areas. Consequently, a great deal of controversy was generated about this route and the original alignment of Georgia 400. Neither of these highways will be constructed as earlier planned, although sections of each either have been built or are planned.

As now planned, the Appalachian Development Highway will follow its original alignment to a point just north of Cumming (this section has been completed) and then curve westward to existing GA-5, with a spur to serve Dahlonega. The highway will then consist of improvements to GA-5 and to US-76. Other improvements to US-76 and GA-282 will provide a major east-west corridor for north Georgia. The only remnant of the Blue Ridge Parkway is I-575, to connect Canton to the Interstate System and to join the Appalachian Highway south of Jasper.

These alterations, especially those on the Appalachian Highway, are still controversial, and continue to divide public opinion in local committees throughout the area. Because there is a possibility that legal actions will be taken, the implementation date of these plans is uncertain. However, by diverting a large part of the route around the National Forest, the most sensitive areas have

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2/ Georgia State Highway Department, "Appalachian Development Highway Map," 1966.

3/ Georgia State Highway Department, "Location Sketch Map: Proposed Blue Ridge Parkway," 1968.

been averted. The developmental highway corridor will in all probability be developed, at least as a four-lane highway.[4/]

Deficiencies in the highway system still abound. Although access from the south will be provided to the Dahlonega-Cleveland area, access from the north will be by two-lane mountain roads. The circuitous routing of the Appalachian Highway may be a deterrent to its use, but the high quality of the highway should tend to offset this. The east-west corridor should prove to be a welcome addition to a system in which most of the major roads run north-south between the ridge lines. The remaining areas appear well serviced by the highways now in existence or by upgradings planned. All will have better access to Atlanta, which serves as the transportation hub for the Region.

Accessibility Analysis

Transportation plays a key role in assisting areas to achieve economic development. In determining which areas in the Appalachian Region are most likely to develop, each area's accessibility to potential major and minor markets must be considered, along with other aspects such as utilities, labor, and natural resources.

An accessibility analysis was prepared for this study in order to provide a comparison among different growth centers within the region. Sixteen cities (all county seats) were selected as centers of potential development. The existing transportation system in the area was examined as a network to determine travel times between all county seats in the study area, as well as eleven major cities external to the area -- Chattanooga, Tenn.; Knoxville, Tenn.; Charlotte, N.C.; Greenville, S.C.; Columbia, S.C.; Augusta, Ga.; Athens, Ga.; Atlanta, Ga.; Macon, Ga.; Birmingham, Ala.; and Huntsville, Ala.

The travel times include three elements:

4/ The current controversy has led to formation of an organization known as SMASH (Stop Mountain Area Superhighways) which opposes upgrading of the highway. See "Comin' Round the Mountain If She Comes," Atlanta Magazine, May 1979.

1. Initial terminal time (time to get out of origin city)
2. Intercity highway travel time
3. Destination terminal time

The terminal times were determined by subjective judgement, based on experience and knowledge of the area.

An important measure of the ability of a location to grow as a service center is the population served within a given length of time. The critical time may vary depending on the service, i.e., the critical time for emergency medical services would be shorter than that for machine parts delivered to an industrial plant. With this sort of limitation, Table 7 indicates the populations within 60, 90, and 120 minutes of each of the potential growth locations. These populations, calculated from the 1970 census of population, include the home county (based on average time to county seat) other counties within the Appalachian Region, and some of the external major cities. A ranking of the Appalachian Centers is provided in descending order, based upon size of population served.

The ranking of any city is determined by its location relative to major population centers and to the Interstate Highway System. Thus, Lawrenceville, Douglasville, and Cartersville, show up particularly well. It should be noted that there is considerable variance between the calculations at different critical times except for Toccoa and Clarkesville. Both of these centers are off the major highway systems and located in less densely populated areas.

This analysis provides a rough indication of potential transportation service areas. However, it does not compensate for those cities near the boundaries of the Region, in ignoring populations of counties outside the Region which are accessible.

Railroad System

Three heavily used rail corridors exist in the Appalachian Region. (See Figure 4). The heaviest is the corridor from Chattanooga to Atlanta, which contains the main Southern Railway System line and the main Louisville and Nashville

Table 7

POPULATION ACCESSIBILITY
IN TRAVEL TIMES FOR POTENTIAL GROWTH CENTERS

	60 MIN.		90 MIN.		120 MIN.	
	Population	Rank	Population	Rank	Population	Rank
Rome	126,968	6	213,867	14	499,885	11
Dalton	128,891	5	304,151	6	535,387	10
Gainesville	100,607	9	217,988	13	894,433	5
Lafayette	81,142	14	302,237	7	472,395	12
Calhoun	194,951	1	342,347	4	656,265	9
Cedartown	136,845	4	293,284	8	968,572	2
Cartersville	161,282	3	839,853	1	1,078,447	1
Douglasville	91,583	12	750,465	2	894,823	5
Carrollton	95,344	10	142,520	15	780,837	8
Lawrenceville	106,136	8	721,425	3	911,176	3
Dahlonega	86,325	13	277,576	9	455,258	13
Winder	117,134	7	275,421	10	888,976	7
Jefferson	173,777	2	324,185	5	894,433	5
Clarkesville	76,708	15	237,752	11	427,443	14
Toccoa	53,806	16	111,318	16	315,853	16
Carnesville (Lavonia)	95,249	11	230,868	12	405,130	15

north-south lines. A second corridor runs northeast from Atlanta to the Carolinas and contains a Southern main line. A westbound corridor from Atlanta to Alabama contains a Southern main line as well as the Seaboard Coast Line's main east-west rail. Figure 4 indicates the level of freight traffic carried over each line. Most of the rail lines in this area are main lines, with only a few branch lines in operation.

Two major operators serving the Appalachian Region are the Southern Railway System and the Family Lines System. The Southern includes the Alabama Great Southern Railroad Company (AGS), Central of Georgia Railroad Company (CofG), Tennessee, Alabama and Georgia Railway Company (TA&G) and, of course, the Southern itself. The Family Lines System includes the Seaboard Coastline Railroad (SCL), the Louisville and Nashville Railroad Company (L&N) and the Gainesville Midland Railroad Company (GM). In addition, an independent operator Hartwell Railway Company provides service from the Southern branch line in Franklin County to Hartwell in Hart County. The only passenger service is provided by AMTRAK's Crescent line from New Orleans through Atlanta to Washington, D.C.

As is the case with highways, the Blue Ridge area of north Georgia is poorly served by rail. The only line close to this area is the L&N branch line through Ellijay and Blue Ridge. The mountainous terrain poses even greater problems for rail than it does for highways, limited as trains are to very low grades.

The future holds little promise for the expansion of main line rail service. In those areas which already have main lines industrial spurs likely can be extended if the demand appears. It is quite possible, in the future, that some areas with branch line service will experience abandonment of that rail service. At the current time, most service seems assured, except for a minor L&N branch which connects to a Southern line at Murphy (N.C.).

Airports

There are only ten air carrier or commuter service airports in Georgia, but none located in the Appalachian Region. Douglas, Paulding, south Bartow, south

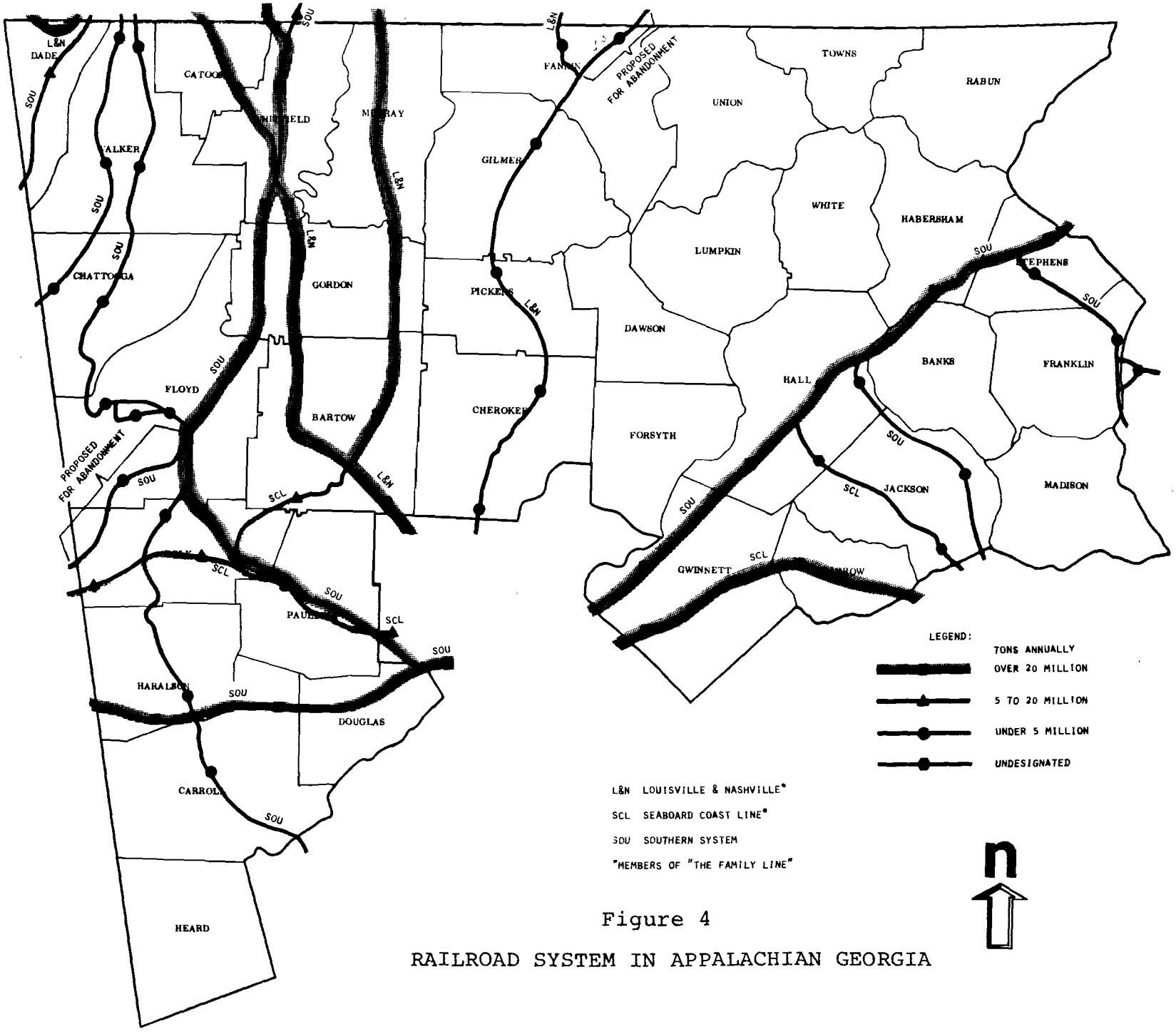

Figure 4

RAILROAD SYSTEM IN APPALACHIAN GEORGIA

south Cherokee, Forsyth, and Gwinnett counties have easy access to Hartsfield International Airport, a major hub, by a medium-to-long drive and/or one of several airport express services. Charlie Brown Airport in Fulton County and DeKalb-Peachtree Airport in DeKalb County provide general aviation facilities to a smaller port of this area. Dade, Walker, Catoosa and Whitfield counties are close to Chattanooga, within reasonable driving distance of its Lovell Field, a small hub air carrier airport.

The only airport facilities accessible to the rest of the Region are local general aviation airports. However, most of the area can be considered reasonably convenient to major carriers for passenger and product transportation, except for the mountainous areas. Here, the terrain prevents location of airports, and also impedes ground transportation to existing ports.

General aviation facilities in the Region, along with nearby major facilities located mostly in the non-mountainous counties, are depicted in Figure 5. These airports fall into three general classifications:[5/]

1. Basic Utility (BU) -- the smallest type of airport included under the National Airport System Plan; these airports generally accommodate about 95% of the general aviation propeller fleet under 12,500 pounds maximum gross takeoff weight (GW).
2. General Utility (GU) -- airports designed to handle over 500 annual operations by aircraft between 8,000-12,500 pounds MGW.
3. Basic Transport (BT) -- airports designed to handle over 500 annual operations of aircraft from 12,500 to 60,000 pounds MGW, including business jets.

One other category is General Transport (GT), which accommodates aircraft up to 175,000 pounds MGW. There are no airports of this type existing or planned in the Region.

5/ U.S. Department of Transportation, Federal Aviation Administration, National Airport System Plans: 1978-1987, 1977.

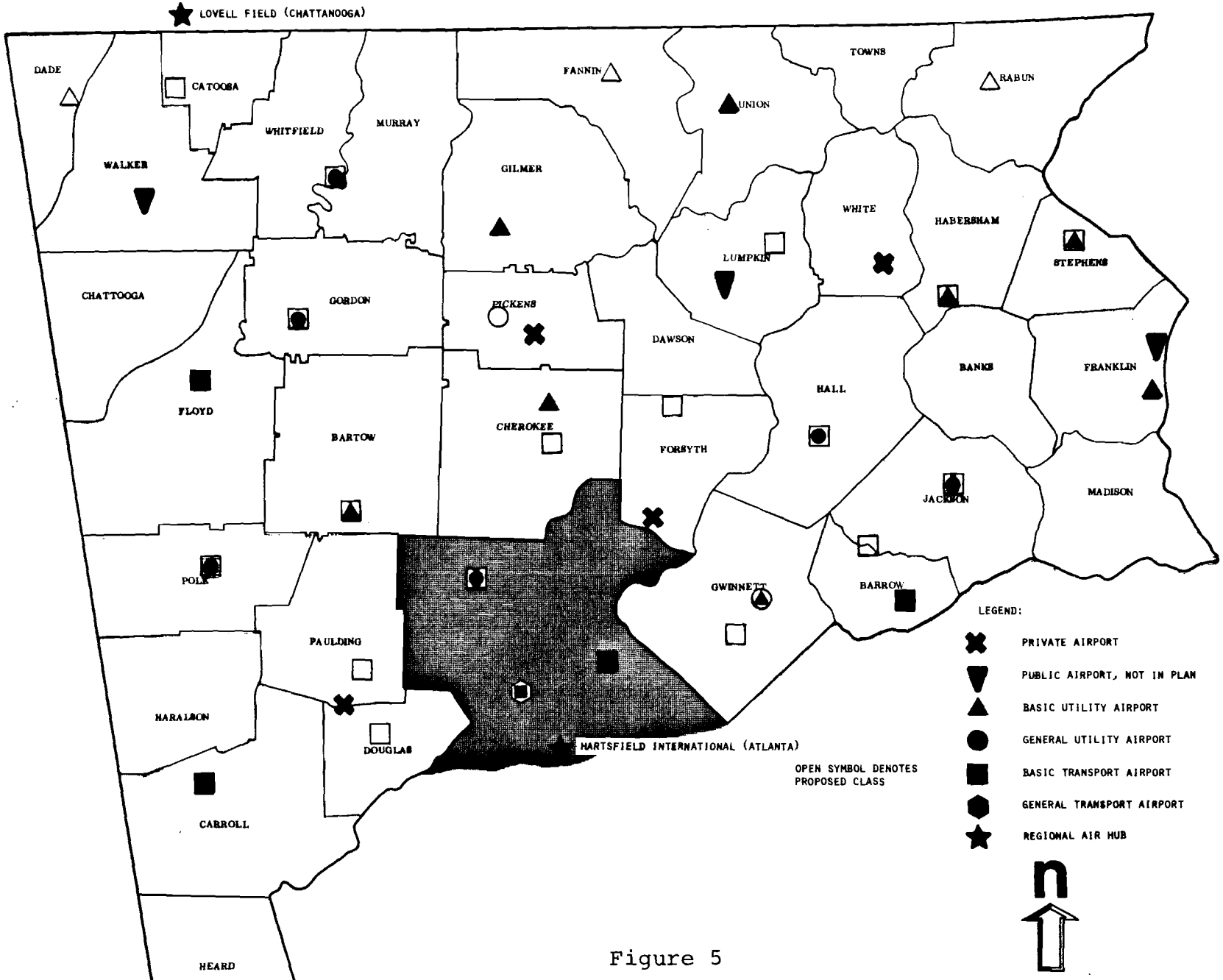

Figure 5

AIRPORTS IN APPALACHIAN GEORGIA

Both the Georgia Department of Transportation's Bureau of Aeronautics and the Federal Aviation Administration have designed plans for improvement of existing airports and construction of new ones in the Appalachian Region. The Georgia plan,[6/] covering the Appalachian Region except for Douglas and Gwinnett counties, provides by 1993 upgrading of eight facilities to the Basic Transport category and the construction of nine new airports, two of them replacements for existing facilities. These improvements would provide most of the population of the Region access to a Basic Transport airport within 20 miles.

Douglas and Gwinnett counties, as well as DeKalb, Cobb, and Fulton counties adjacent to the Appalachian Region, are included in the FAA "National Airport System" plan.

Intercity Bus Service

Intercity bus service in the Appalachian Region ranges from very good along the I-75, I-20, and I-85 corridors to nonexistent in north central Georgia. (See Figure 6).

Both Trailways and Greyhound offer express service in the freeway corridors, serving only the major cities such as Dalton or Cartersville. Parallel local routes also serve other cities on other highways. Trailways operates buses on U. S. 411 through Chatsworth, which are not allowed to pick up passengers in Georgia until they reach Atlanta. American Coach line operates service from Atlanta through Commerce, Cornelia, and Clayton to Asheville, North Carolina.

Some of the rural service lines are in trouble due to the declines in patronage and inflating costs of the bus industry. Most immediate are routes of Greyhound on US-23 from Atlanta through Gainesville, Cornelia, and Toccoa into South Carolina, which are being dropped. However, it is possible that American Coach Lines or another commuter carrier will take over service as far as Cornelia.

6/ Georgia Department of Transportation, Georgia Airport System Plan: 1973-1993, 1972.

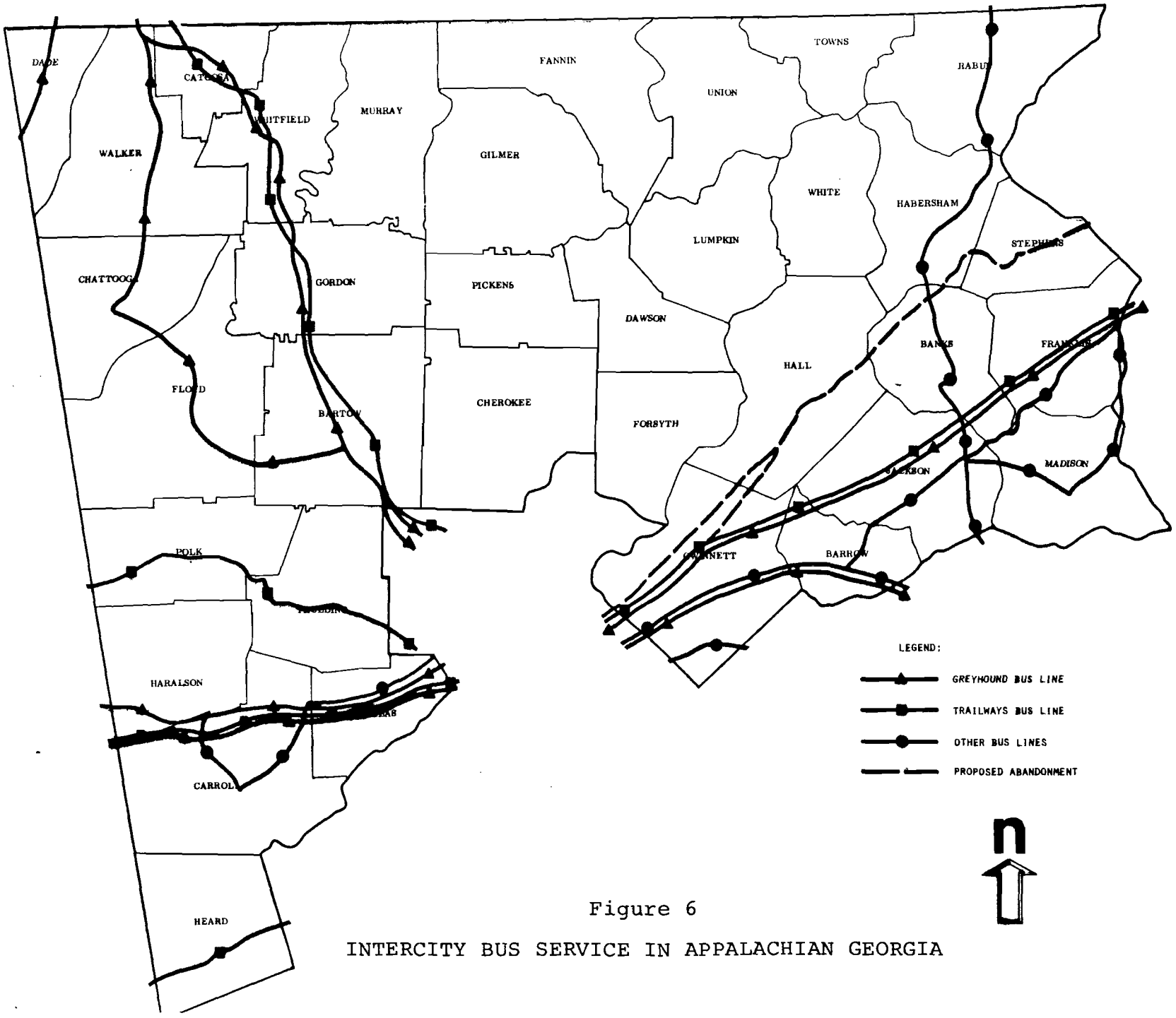

Figure 6

INTERCITY BUS SERVICE IN APPALACHIAN GEORGIA

Little or no expansion of intercity bus service is forseen in the near future, although energy constraints combined with possible federal/state financial aid may change this.[7/] The Georgia Department of Transportation has been interested in the possibility of east-west service from Gainesville through Dahlonega, Blue Ridge, and Ellijay to Dalton; such service at the present would be low volume and would require a heavy subsidy.

Pipelines

In the assessment of transportation systems, pipelines are often overlooked. This "invisible" system is responsible for the transportation of over 25% of the total U. S. freight tonnage,[8/] primarily carrying natural gas or petroleum and its products. Natural gas pipelines are especially important in portions of the Appalachian Region.

The system of pipelines in the Appalachian Region are displayed in Figure 7. Atlanta Gas Light Company operates distribution lines from Rome to Trenton in the northwest. United Cities Gas Company and Atlanta Gas Light Company operate distribution lines to Gainesville and north Hall and Banks counties. In addition, Southern Natural Gas Company operates a pipeline from Alabama through Rome. Transcontinental Gas Pipeline Company operates a major pipeline in the corridor from Alabama through Atlanta into the Carolinas.

Excluding northwest Georgia, the entire northern part of the Appalachian Region above Gainesville has no ready access to natural gas. As a fuel substitute, these areas rely on liquid propane gas trucked in from Chattanooga or Atlanta.

The major petroleum pipeline system consists of parallel lines of Plantation Pipe Line Company and Colonial Pipe Line Company, transporting gasoline and heating

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7/ Georgia Institute of Technology, Engineering Experiment Station, Economic Development Laboratory, Georgia Intercity Bus System Evaluation, 1979.

8/ U.S. Department of Transportation, National Transportation Trends and Choices, 1977.

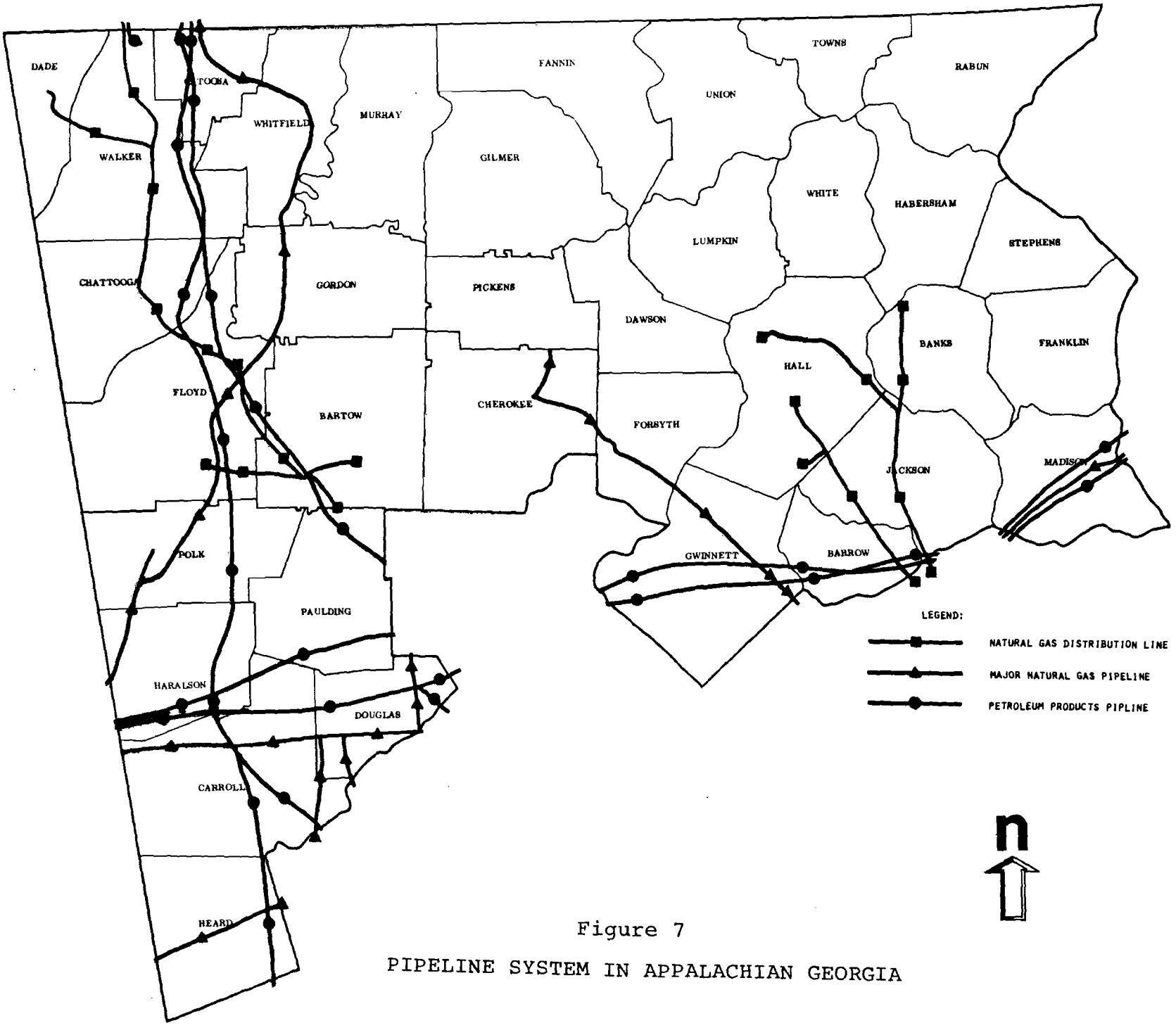

Figure 7

PIPELINE SYSTEM IN APPALACHIAN GEORGIA

oil from Louisiana refineries to the northeastern United States. Major distribution centers for these products are at Doraville in DeKalb County and in west Atlanta. Major petroleum pipelines branch from Atlanta northwest through Chattanooga, Tennessee.

At the present time, there are no announced plans to expand natural gas or petroleum pipelines through the Region, while there is the possibility that a coal slurry pipeline from coal fields in Kentucky to Florida might be built through the area, no plans for feasibility studies or engineering field studies have been proposed.

ASSESSMENT OF WATER SYSTEMS

Supply Sources

Any Appalachian municipality seeking new industry must consider the demand the results might place on the existing potable water system. Industries with limited needs for water, i.e. those which require sanitary service as opposed to process water, probably will find that municipal water systems are the most economic source of supply. Industries which require large amounts of water generally prefer access to surface water supplies for which they install their own treatment to the levels their processes require. Wells and/or springs generally are not sufficient to satisfy the substantial in-takes and dependability requirements of a large water-using industry. An exception to this rule of thumb are the large moderately stable springs located in the northwest portion of Georgia.

Water supplies, therefore, can be a constraint in either limitations possible from municipal supplies or limitations in the availability of large-scale surface water withdrawal sources.

Existing Municipal Systems

The capacity of a given municipal system is a function of the source from which the water is drawn and the type of treatment required. Wells and springs are constrained by the amount of water which can be drawn off and by the recharge rates of the aquifer supplying the well or spring. The capacity of a spring can be estimated and pumping tests can reveal the capacity of a well; but very little data exist on how long these capacities can be maintained. A well could lose its productive capabilities at any time, and even springs are subject to the geological structure from which they can originate. For example, it has been noted that the water quality of the springs used in northwest Georgia counties deteriorate temporarily (such as increases in turbidity) when earthquakes occur as far away as Alaska.

The capacity data presented in Table 8 for springs and wells were derived

from operating reports and permit applications submitted to the Environmental Protection Division of the Georgia Department of Natural Resources. These data consist of the original tests conducted in the case of wells and an estimation of minimum annual flows in the case of springs. Flow profiles of those springs for which annual data are available show considerable variations in flow, with October-November measures being quite low.

Surface water withdrawals can be constrained in one of two ways. First is the limitation set by the capacity of the water treatment facility, and second the low flow of the water source. The data presented in Table 8 provide the design capacities of the existing treatment plants.

Current Water Demands

Water demands can be measured from the perspective of maximum demand or of average demand. Average demand is the most applicable for the analysis of a supply constraint because this is the amount which must be maintained on a more or less continuous basis. When peaks are encountered in a system, they can generally be handled by the storage capabilities of the system. When those peaks tax the storage and/or pumping capabililities, the effect is a lowering of pressure which could reduce fire-fighting capabilities temporarily. Pressures and storage levels can be restored, however, if the capacity average is not exceeded for long periods of time.

Average demands on the water supply systems in the 35 Appalachian counties according to data gathered from the operating files of the State Environmental Protection Division are shown in Table 8.

Analysis for Constraints

A constraint would be indicated whenever average demands approach the design capacity of the system. Excess capacity would be that design capacity over and above the average demand. In order to quantify the capability of the ARC counties to support economic growth, the excess capacities of the municipal systems were converted to population equivalents. A regression analysis was then performed on

Table 8

MUNICIPAL WATER SYSTEMS
1979

	Source	Capacity (mgd)	Demand (mgd)	Excess Capacity (mgd)	Population Equivalent
Banks County					
Homer	W	N.A.	N.A.	N.A.	N.A.
Maysville	W	.13	.037	.093	1,162
Barrow County					
Auburn	W	.09	.061	.029	362
Statham	SP (2)	.43	.2	.23	2,875
Winder	SW	3.0	2.0	1.0	12,500
Bartow County					
Adairsville	SP	5.9	.2	5.7	71,250
Cartersville	SW	6.34	4.77	1.57	19,625
Emerson	W	.11	.05	.06	750
Kingston	W (1)	.27	.1	.17	2,125
White	W (4)	.42	.4	.02	250
Carroll County					
Bowdon	SW	.36	.32	.04	500
Carrollton	SW	8.	4.9	3.1	38,750
Mt. Zion	W (3)	.57	.15	.42	5,250
Roopville	W	N.A	N.A.	N.A.	N.A.
Temple	SW	.25	.15	.1	1,250
Villa Rica	SW	1.0	.543	.457	5,712
Whitesburg	W (3)	.14	.12	.06	750
Catoosa County					
Ringgold/County System	SW	1.5	.88	.62	7,750
Chattooga County					
Lyerly	W	.1	.086	.014	175
County System	W (4)	.73	.11	.62	7,750
Menlo	W/SP (2)	N.A.	.08	N.A.	N.A.
Summerville	SP/SW	2.51	2.15	.36	4,500
Trion (Riegel)	SP	8.6	7.0	1.6	20,000
Cherokee County					
Ball Ground	W	.14	.075	.065	812
County System	SW	2.2	1.75	.45	5,625
Cumming	SW	1.59	1.19	.4	5,000
Dade County					
County System	SW	1.26	.99	.27	3,375
Rising Fawn	SP	.08	.03	.06	750

MUNICIPAL WATER SYSTEMS (Cont'd)

	Source	Capacity (mgd)	Demand (mgd)	Excess Capacity (mgd)	Population Equivalent
Dawson County					
Dawsonville	SP	.144	N.A.	N.A.	N.A.
Douglas County					
County System	SW	1.009	.61	.399	4,988
Douglasville	SW	.934	.82	.114	1,425
Fannin County					
Blue Ridge	SW	1.1	.3	.8	10,000
McCaysville	SW	.288	.2	.088	1,100
Mineral Bluff	W	.13	.024	.106	1,325
Morganton	W	.36	.06	.3	3,750
Floyd County					
Brighton Mills	SW	.58	.41	.17	2,125
Cave Spring	SP	2.5	.25	2.25	28,125
Rome/County Sys.	SW	13.1	11.1	2.	25,000
Forsyth County					
Cumming	SW	1.59	1.19	.4	5,000
Franklin County					
Canon	W (2)	.14	.043	.097	1,212
Carnesville	W (3)	.91	.5	.41	5,125
Franklin Spring	W (2)	.2	.105	.11	1,375
Lavonia	SW	1.2	.42	.78	9,750
Royston	SW	1.0	.43	.57	7,125
Gilmer County					
Ellijay/ East Ellijay	SP	1.42	.83	.59	7,375
Gordon County					
Calhoun	SW	9.95	7.39	2.56	32,000
Fairmount	SW	.26	.17	.09	1,125
Gwinnett County					
Buford	SW	1.5	.65	.85	10,625
County System	SW	27.16	16.8	10.36	130,000
Dacula	W	N.A.	N.A.	N.A.	N.A.
Grayson	W	.04	.03	.01	125
Lawrenceville	W	N.A.	N.A.	N.A.	N.A.
Snellville	W	N.A.	N.A.	N.A.	N.A.
Sugarhill	W	N.A.	N.A.	N.A.	N.A.
Suwanee	W	.29	.06	.23	2,875

MUNICIPAL WATER SYSTEMS (Cont'd)

	Source	Capacity (mgd)	Demand (mgd)	Excess Capacity (mgd)	Population Equivalent
Habersham County					
Alto	W	.2	.033	.167	2,088
Baldwin	W (3)	.22	.09	.13	1,625
Clarkesville	SW	1.0	.6	.4	5,000
Cornelia	SW	2.5	2.1	.4	5,000
Demorest	W (3)	.79	.2	.59	7,375
Mt. Airy	W	N.A.	N.A.	N.A.	N.A.
Hall County					
Flowery Branch	W (2)	N.A.	N.A.	N.A.	N.A.
Gainesville	SW	9.9	9.0	.9	11,250
Lula	W	.19	.048	.142	1,775
Haralson County					
Bremen	SW	.8	.64	.16	2,000
County System	SW	2.5	.87	1.63	20,376
Heard County					
Franklin	W	N.A.	.175	N.A.	N.A.
Jackson County					
Braselton	W (4)	.43	.05	.38	4,750
Commerce	SW (2)	2.75	1.52	1.23	15,375
Hoschton	W	.18	.038	.142	1,775
Jefferson	SW	2.25	1.0	1.25	15,625
Maysville	W	N.A.	N.A.	N.A.	N.A.
Lumpkin County					
Dahlonega	SW	1.46	.44	1.02	12,750
Madison County					
Carlton	W (3)	.13	.02	.11	1,375
Comer	W (3)	.22	.1	.12	1,500
Colbert	W	N.A.	.06	N.A.	N.A.
Danielsville	W (2)	.29	.075	.215	2,688
Ila	W	.14	.05	.09	1,125
Murray County					
Chatsworth	SP/SW	5.6	4.82	.78	9,750
Paulding County					
Dallas	SW	.432	.31	.122	1,525
Hiram	W	.058	.04	.018	225
Pickens County					
County System	SP (3)	.11	.108	.002	25
Jasper	SW	1.0	.93	.07	875
Nelson	W	N.A.	N.A.	N.A.	N.A.

MUNICIPAL WATER SYSTEMS (Cont'd)

	Source	Capacity (mgd)	Demand (mgd)	Excess Capacity (mgd)	Population Equivalent
Polk County					
Cedartown	SP	4.0	1.8	2.2	27,500
County System	SP (2)	.95	.5	.45	5,625
Rockmart	SW	1.76	1.1	.66	8,750
Rabun County					
Clayton	SW	1.0	.7	.3	3,750
Stephens County					
Toccoa	SW	9.0	3.6	5.4	67,500
Towns County					
County System	W (3)	.78	.04	.74	9,250
Hiawassee	W (3)	.78	.15	.63	7,875
Young Harris	W	.43	.025	.402	5,025
Union County					
Blairsville	W	.58	.27	.31	3,875
Walker County					
Chickamauga/ County System	SP	8.9	.48	9.62	120,250
Lafayette	SW/SP	1.0	.49	.51	6,375
White County					
Cleveland	SW	.5	.2	.3	3,750
Helen	W	.115	.044	.071	888
Whitfield County					
Dalton	SW	52.5	33.87	*	*

W: wells

SW: surface water

SP: springs

* Limited in water withdrawal

Source: Data from Georgia Department of Natural Resources, Environmental Protection Division, 1979.

a random sample of 25 municipalities, indicating that the average incremental per person usage was approximately 80 gallons per capita per day. The excess capacity divided by usage rate yielded the capacity in population equivalents as listed in Table 8.

Summary of Results and Recommendations

The analysis conducted reveals that some excess capacity exists in all municipal systems. It must be emphasized, however, that the installation of additional treatment and/or distribution capacity in many cases does have considerable lead time associated with it. If a municipal system reaches design limits prior to the initiation of expansion plans, the situation is likely to become critical prior to the completion of the expansion program.

When a municipality should begin to plan for expansion of the system depends upon the level of current utilization of capacity and the rate of growth. Population data indicate that most of the ARC counties are growing. Certain of the municipalities are experiencing high growth rates with limited water system capacity.

The population equivalents provide additional insight as to locations either with excess capacity or limitations upon further service. Most potential industries can relate their anticipated water needs to population equivalents, employing these measures:

1. Additional employment created which does not reside in the municipal service area will generate 35 gallons of water demand per employee for sanitary service.
2. Additional employment which would reside in the municipal service area would contribute 80 gallons of water demand per person in the household (a general average of 3.5 persons).
3. Any process water required by the industry (measured in gallons per day) would be divided by 80 to yield the population equivalent.
4. The total water demand would be the sum of 1, 2 and 3 above.

It should be recognized that a municipality could not expand its water service to the full population equivalents shown without running the risk of critical loss of pressure. Those municipalities with low (less than 1,000) population

equivalent capacities are:

Auburn	Jasper
Ball Ground	Lyerly
Bowdon	Pickens County
Emerson	Rising Fawn
Grayson	White
Helen	Whitesburg
Hiram	

Those municipalities with high population equivalent capacities i. e. greater than 10,000, are:

Adairsville	Dahlonega
Blue Ridge	Gainesville
Buford	Gwinnett County
Carrollton	Haralson County
Cartersville	Jefferson
Cave Spring	Rome/Floyd County
Cedartown	Toccoa
Chickamauga	Trion
Commerce	Winder

These municipalities would be the most attractive candidates for economic growth from the standpoint of available municipal water supplies. By the same token, these municipalities would have some comparative advantage over those which are limited in their potable water supply capabilities. (See Figure 8).

Other Factors

Several municipalities are experiencing water supply difficulties which this methodology and overall analysis do not reveal. The most significant of these are enumerated below.

Adairsville -- needs to cover the spring from which it is drawing water in order to prevent problems from contamination.

Blue Ridge -- is experiencing problems with the electrical control system in the newly-completed surface water treatment plant which reduces the reliability of the system.

Clayton -- the downtown area is losing approximately 400,000 gpd of potable water through a leak of yet undetermined origin.

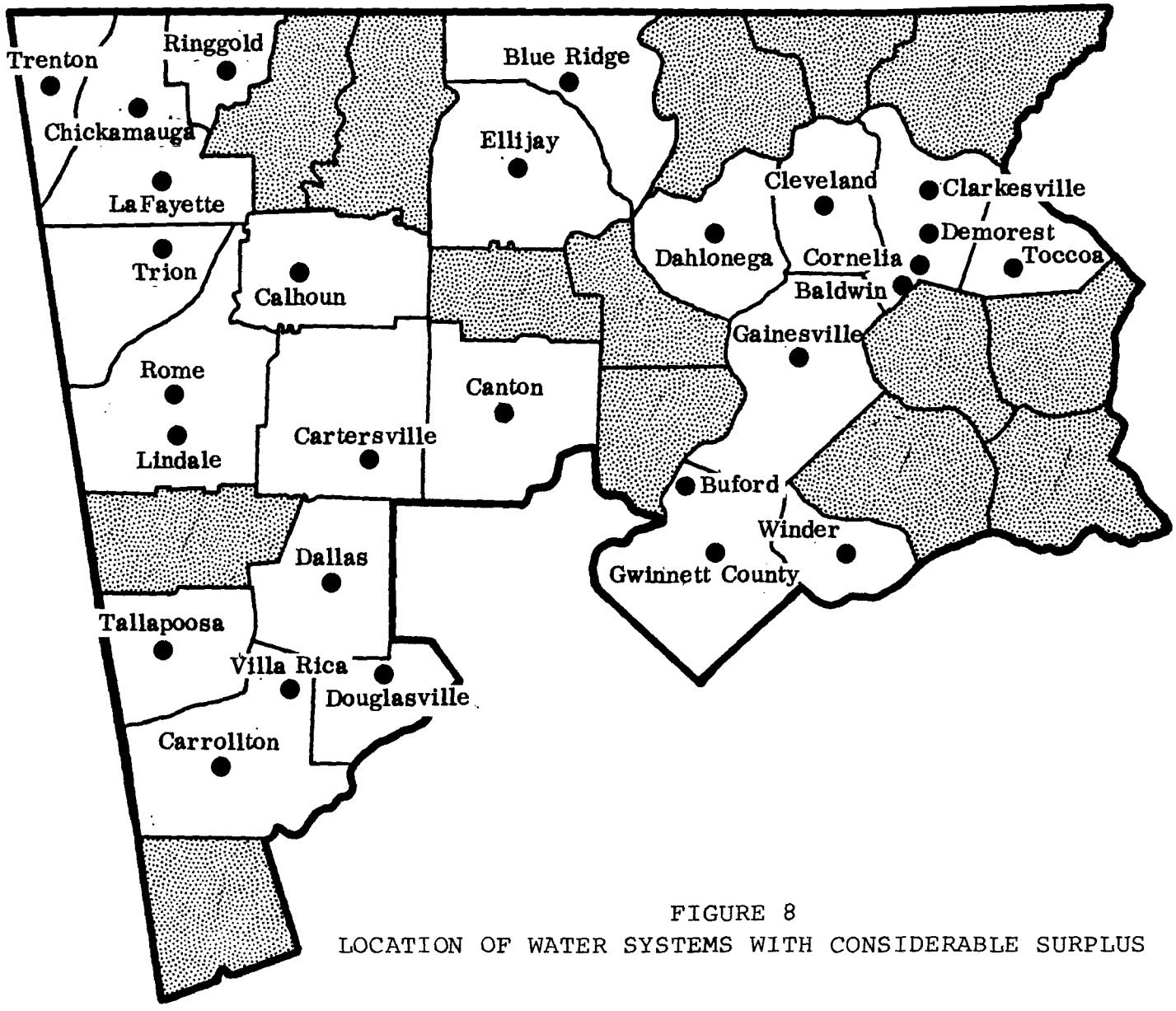

FIGURE 8
LOCATION OF WATER SYSTEMS WITH CONSIDERABLE SURPLUS

Dahlonega -- like Blue Ridge, is experiencing problems with electrical control system.

Dalton -- is limited in its withdrawal rates by the need for downstream dilution to assist wastewater assimilation.

Fairmount -- is experiencing problems due to the design of its treatment system. Recent minor modifications have been implemented which have alleviated the problem, but not solved it.

Franklin -- has a large number of wells which are sometimes taxed by one large industry.

Whitesburg -- has wells which fail at an abnormal rate. Expansion of the system with additional wells may not be possible.

ASSESSMENT OF WASTEWATER TREATMENT PLANT CAPACITIES

Importance of Treatment Facilities

Wastewater treatment plant capacity is more important today than ever before. Environmental concerns have led to strict controls over all wastewater discharges, with legal limits established for both quantity and quality of every wastewater discharge in the state. The basis for the limitations is contained in regulations written by EPA under the National Pollutant Discharge Elimination System (NPDES), administered in Georgia by the Georgia Department of Natural Resources Environmental Protection Division (EPD).

Inadequate wastewater treatment plant capacity can constrain sound economic growth in several fashions. One follows from the need to provide for additional population. If soil conditions do not allow adequate percolation for household wastewaters, individual septic tanks may not be a viable alternative for households or businesses. A centralized treatment with adequate capacity thus becomes necessary if a high quality environment is to be attained.

The second possible constraint follows from the fact many manufacturing processes require large amounts of water, which must be discharged after use. It is seldom economical for an individual firm to construct and maintain a complete wastewater treatment system; this capacity must be made available by the municipality in order to realize the economies of scale in constructing and operating wastewater treatment facilities.

If an industry wishes to locate or expand its facilities in a given area, it may not be able to do so if adequate wastewater treatment capacity is not available. Conversely, the availability of treatment capacity can be a significant attracting force to potential industries.

Capacity Measurements

In order to assess the existence of adequate wastewater treatment plant capacity, it was first necessary to survey the 35 ARC counties to determine

both the size and current flows of all wastewater treatment plants. Excess capacity is defined as the difference between the legal size and current flows. It was further necessary to determine if plans were underway to upgrade or expand the existing plants and what the status of those plans were. The majority of the information was compiled from the files and records of EPD, and even though EPD's information was the most accurate available, several caveats must be noted.

First, "capacity" is not a precise term. When a wastewater treatment plant is constructed, the design capacity defines the size of the individual treatment plant components. After the plant is in operation, however, this design parameter may be safely exceeded with no loss of treatment level due, perhaps, to a lower influent strength than was originally expected. Similarly, the actual capacity may be significantly less than the design due to operational inefficiencies, higher strength wastes than originally expected, or incompatible industrial wastes. Some treatment processes are amenable to modification, which can significantly add to capacity with only minor modifications.

Two problems occur with regard to in quantifying "current flows" through the wastewater treatment plant. The first reflects the common problem of "infiltration/inflow." These terms refer to the fact that whenever minor rainfall occurs, or there is high groundwater, extraneous flows enter the wastewater system and can overload the facility's capacity. Typically, flows entering the system vary significantly depending on the rainfall events that occur during that particular month.

Second, many wastewater treatment plants especially those constructed earlier than five years, do not have adequately calibrated flow measurement devices. Some plants do not have flow measurement structures of any kind. This problem of accurate measurement is most evident with the small facilities, i.e., those with capacity less than .5 million gallons per day.

Given the problems associated in quantifying both capacity and current flow, any discussion of the availability of wastewater treatment plant capacity must be qualified. The best measure of capacity appears to be given by the NPDES permit.

While this measure may be somewhat higher or lower than the engineered capacity, it does represent the legal maximum average daily discharge. Current flows were determined by taking the average of wet-weather flows and dry-weather flows, unless the flow data indicated sharp peaks following rainfall events that obviously overloaded the facility. In such cases average flows would be seriously overestimated if these data points were included in the calculations. To avoid this, the flow data were examined for the previous year and a representative monthly average, i.e., one which contained some wet and some dry weather, was selected. Flow data were obtained from examination of the reports submitted to EPD by the municipalities as required by the discharge permit. A list of the existing wastewater treatment plants by county, with legal capacity, estimated current average flows, and excess capacity is displayed as Table 9.

Future Capacities

The future availability of wastewater treatment plant capacity depends upon funding for expansions. The major funding source for such expansions is via Public Law (PL) 92-500, which provides funds through the Environmental Protection Agency to the EPD at the state level. The grants under this program are for planning, design, and construction. In Georgia, the majority of planning has already begun and, in most cases, is in an advanced stage. It is, therefore, possible to project when additional capacity may be installed in a municipality under this program by analyzing the relative priority of each discharge vis-a-vis the anticipated funds available.

At this present time only those municipalities with existing discharges have sufficient priority to have obtained PL 92-500 funding for planning. Municipalities which do not have wastewater treatment plants may be able to secure such funding under new regulations which emphasize alternative wastewater treatment techniques for small communities. It should be noted that PL 92-500 concentrates on upgrading and expanding treatment plants; very little funding is available for service area expansion.

Constraints

Analysis of the existence of a population constraint was based on the assumption

that, on the average, one person would generate 100 gallons of wastewater per day, a common assumption utilized by engineers in designing wastewater treatment plants, even though it is generally recognized to be somewhat conservative. Research has indicated that actual usage in rural areas is generally in the range of 60 to 70 gallons per capita per day (gpd) and for other cities and towns is 65 to 80 gpd.[1/] The more conservative figure allows for extraneous flows from high groundwater or rainfall, occurring in almost all systems. A municipality does have some control over both the amount of extraneous flows and the average usage.

The best method of assessing wastewater treatment plant capacity is to convert excess capacity into population equivalents on the 100-gpd usage assumption. Population equivalents were also calculated on a 60 to 70-gpd assumption (using 65 gpd as an average) to give an indication of how much the facility could be extended if extraneous flows were eliminated and water conservation measures were adopted. Such equivalents are shown in Table 9.

It is much more difficult to assess the ability of a municipality to provide capacity to a "wet" industry. Industrial wastes, can be characterized according to certain parameters which can then be used to estimate the population equivalent of the waste. Domestic wastes normally are characterized by two strength parameters: a five-day biochemical oxygen demand (BOD) of 250 mg/l and suspended solids (SS) of 250 mg/l, and a flow parameter of 100 gpd. The industrial waste strength parameters are then divided by the applicable domestic strength equivalent, and this factor multiplied by the population flow equivalent.

For example, if a particular industry were characterized by wastes having strengths of: (1) BOD = 1000 mg/l, (2) SS = 250 mg/l and (3) Flow = 10,000 gpd, then the approximate population equivalent would be 400. In order to serve this industry, the municipality should have available the capacity to serve an additional 400 persons. Alternatively, the municipality could choose to seek a "dry" industry and thereby utilize its available capacity for population growth.

1/ U. S. Environmental Protection Agency, Municipal Wastewater Treatment Works, 40 CFR Pt. 35 (1978).

Table 9

MUNICIPAL WASTEWATER TREATMENT PLANTS
1979

(in millions of gallons per day)

	Discharge Classification [1]	Legal Capacity	Current Flow	Excess Capacity	Expected PL 92-500 Funding Date
Barrow County					
Statham	E	.15	N.A	N.A.	
Winder	E	.5	.26	.24	
Bartow County					
Adairsville	E	.19	.23	0	
Cartersville	E	5.0	4.1	.9	
County Plant - Cassville	E	.1	.048	.052	
County Plant - U.S. 41	E	.1	.04	.06	
Emerson	E	.17	N.A.	N.A.	
Carroll County					
Bowdon	E	.2	.13	.07	
Carrollton #1	W	5.0	3.4	1.6	9-80
Carrollton #2	W	1.0	.5	.5	9-80
Villa Rica - North	W	.26	.1	.16	10-81
Villa Rica - West	W	.26	.14	.12	10-81
Catoosa County					
County Plant-Brookvale	E	.032	N.A.	N.A.	4-80
County Plant-Morris Est.	E	.08	N.A.	N.A.	4-80
Fort Oglethorpe	E	2.0	2.17	0	
Ringgold [2]	E	.7	.55	.15	
Chattooga County					
Summerville	E	2.0	1.9	.1	
Trion	E	5.0	3.25	1.75	
Cherokee County					
Canton	E	1.89	.2	1.69	
Woodstock	E	.15	.17	0	
Dade County					
Trenton	E	.32	.09	.23	
Dawson County					
Dawsonville	E	.06	.03	.03	
Douglas County					
County - Spring Hill	E	N.A.	.012	N.A.	
Douglasville					
North Plant	E	1.0	.1	.9	4-80
Rebel Trails S/D	E	.04	N.A.	N.A.	
South Plant	W	1.0	.95	.05	4-80

MUNICIPAL WASTEWATER TREATMENT PLANTS (Cont'd)

	Discharge Classification [1]	Legal Capacity	Current Flow	Excess Capacity	Expected PL 92-500 Funding Date
Fannin County					
Blue Ridge	E	.62	.45	.17	
McCaysville [3]	E	N.A.	N.A.	N.A.	
Floyd County					
Cave Spring	E	.22	N.A.	N.A.	
County Plant-Lindale	E	.4	.08	.32	
County Plant-Shannon	E	.26	.38	0	
Rome	E	18.0	14.3	3.7	10-83
Forsyth County					
Cumming	E	.25	.16	.09	
Franklin County					
Lavonia	E	.37	.92	0	
Royston	E	.35	.34	.01	
Gilmer County					
Ellijay	E	2.0	.6	1.4	
Gordon County					
Calhoun	E	7.0	5.45	1.55	10-83
Gwinnett County					
Buford					
Southside	E	1.0	.5	.5	
Westside	E	.25	.09	.16	
County Plants					
Beaver Ruin/Sweetwater Creek	W	2.5	2.2	.3	
Big Haynes Creek [3]	W	.5	.22	.28	
Camp Creek School	W	.06	N.A.	N.A.	
Claiborne Manor	W	.104	N.A.	N.A.	1-80
Crooked Creek	W	4.0	1.2	2.8	
Days Inn	W	.025	.020	.005	
Glenn Forest [3]	W	.05	N.A.	N.A.	1-80
Holiday Inn [3]	W	.04	.035	.005	
Jacks Creek	W	.07	N.A.	N.A.	
Jackson Creek	W	2.4	1.04	1.36	
Lee Acres	W	.07	N.A.	N.A.	1-80
River Oak Village [3]	W	.161	N.A.	N.A.	1-80
Shannon Woods [3]	W	.025	N.A.	N.A.	1-80
Lawrenceville					
Red Land Creek [3]	W	.63	.67	0	1-80
Shoal Creek [3]	W	.24	N.A.	N.A.	1-80
Lilburn	W	N.A.	N.A.	N.A.	
Snellville	W	.3	N.A.	N.A.	

MUNICIPAL WASTEWATER TREATMENT PLANTS (Cont'd)

	Discharge Classification [1/]	Legal Capacity	Current Flow	Excess Capacity	Expected PL 92-500 Funding Date
Habersham County					
Baldwin	E	.3	.037	.263	
Clarkesville	E	.75	.4	.35	
Cornelia	E	2.5	1.5	1.0	1-80
Demorest	E	.4	.018	.382	
Hall County					
Gainesville					
Flat Creek	E	7.0	5.0	2	
Linwood	E	3.0	1.0	2	
Lula	E	.08	.01	.07	
Haralson County					
Bremen					
Baxter Creek	E	.2	.1	.1	10-82
Buck Creek	E	.3	.29	.01	10-82
Buchanan	E	.17	.06	.09	
Tallapoosa	E	.5	.2	.3	
Heard County					
Franklin	E	.085	.1	0	
Jackson County					
Braselton	E	.07	.02	.05	
Commerce					
City Plant	E	.7	.75	0	
Davis	E	.067	.03	.037	
Holiday Inn	E	.041	.015	.026	
Jefferson	E	.12	.035	.085	
Maysville	E	.06	.06	0	
Lumpkin County					
Dahlonega	E	.72	.2	.52	
Madison County					
Comer	E	.09	.05	.04	
Murray County					
Chatsworth	E	.75	.8	0	
Paulding County					
Dallas					
North Plant	E	.11	N.A.	N.A.	6-80
West Plant	E	.416	.26	.156	
Pickens County					
Jasper					
East Plant	W	.08	N.A.	N.A.	7-80
West Plant	W	.1	.13	0	7-80

MUNICIPAL WASTEWATER TREATMENT PLANTS (Cont'd)

	Discharge Classification [1]	Legal Capacity	Current Flow	Excess Capacity	Expected PL 92-500 Funding Date
Polk County					
Cedartown	W	1.2	1.6	0	10-83
County Plant - Aragon	E	.175	.07	.105	
Rockmart	E	.6	1.25	0	
Rabun County					
Clayton	E	.16	.13	.03	
Stephens County					
Toccoa					
City Plant	E	.41	.3	.11	
Eastanolle Creek	E	1.45	1.1	.35	
Eastanolle School	E	N.A.	N.A.	N.A.	
Towns County					
Hiawassee	E	.1	.011	.089	
Young Harris	E	N.A.	N.A.	N.A.	1-80
Union County					
Blairsville	E	.075	.04	.069	
Walker County					
Chickamauga	W	5.0	2.0	3.0	10-80
Lafayette	W	5.0	3.4	1.6	1-81
White County					
Cleveland	E	.35	.23	.12	
Whitfield County					
Dalton	W	22.0	25.0	0	4-81

[1] W: water quality limited

E: effluent limited

[2] under construction

[3] Flow to be diverted to new plant.

Source: Georgia Environmental Protection Division, Atlanta, Ga., monthly flow data, 1979

Costs

The cost to municipalities of providing wastewater treatment services is not constant and is largely a function of the required level to which the wastes must be treated prior to discharge and the treatment process which is utilized. Actual per unit treatment costs for the surveyed municipalities were not available, nor were data available on projected costs for planned facilities, but those municipalities which have existing facilities have been investigated to determine, whether or not secondary treatment levels would be sufficient. Secondary treatment (in some cases secondary with exceptions) is the minimum level allowed under present environmental standards. Streams which will accept this level of treatment for municipal wastes are known as "effluent limited". Streams which require higher treatment levels are known as "water quality limited." In general, wastewater treatment plants discharging into water quality limited stream segments have higher costs both in initial construction and in operation and maintenance.

Table 9 identifies municipalities currently discharging into water quality limited stream segments and those currently discharging into effluent limited segments. The municipalities which are constructing facilities under PL 92-500 grants will be required to develop and implement user charge/industrial cost recovery systems. The requirements stipulate that each user of the system pay a charge proportional to their contribution to operating cost. Industries are required to reimburse the federal government and the municipality for their contribution to operating cost, reducing the flexibility which a municipality may have in providing incentives for potential industries.

Analysis of Systems

As seen in Table 10, 14 wastewater treatment plants are at or exceeding capacity:

Adairsville	Floyd County -- Shannon	Lawrenceville -- Redland Creek 1/
Cedartown	Fort Oglethorpe	Maysville
Chatsworth 1/	Franklin	Rockmart 1/
Commerce	Jasper 1/	Woodstock
Dalton 1/	Lavonia 1/	

1/ Expecting funding under PL 92-500.

Table 10

POPULATION EQUIVALENTS OF CURRENT WASTEWATER TREAMENT CAPACITY
1979

	Excess Capacity (mgd)	Population Equivalents 100 gpd	65 gpd Incremental Service	65 gpd All Service
Barrow County				
Statham	N.A.	N.A.	N.A.	N.A.
Winder	.24	2,400	3,692	6,292
Bartow County				
Adairsville	0	0	0	923
Cartersville	.9	9,000	13,846	44,923
County Plant - Cassville	.052	520	800	1,058
County Plant - U.S. 41	.06	600	932	1,138
Emerson	N.A.	N.A.	N.A.	N.A.
Carroll County				
Bowdon	N.A.	N.A.	N.A.	N.A.
Carrollton #1	.07	700	1,077	1,777
Carrollton #2	.5	5,000	7,692	10,385
Villa Rica - North	.16	1,600	2,462	3,000
Villa Rica - West	.12	1,200	1,846	2,600
Catoosa County				
County Plant - Brookvale	N.A.	N.A.	N.A.	N.A.
County Plant - Morris Est.	N.A.	N.A.	N.A.	N.A.
Fort Oglethorpe	0	0	0	11,169
Ringgold	.15	1,500	2,308	5,769
Chattooga County				
Summerville	.1	1,000	1,538	15,769
Trion	1.75	17,500	26,923	46,923
Cherokee County				
Canton	1.69	16,900	2,600	27,077
Woodstock	0	0	0	607
Dade County				
Trenton	.23	2,300	3,438	4,023
Dawson County				
Dawsonville	.03	300	462	623
Douglas County				
County - Spring Hill	N.A.	N.A.	N.A.	N.A.
Douglasville				
North Plant	.9	9,000	13,846	14,385
Rebel Trails S/D	N.A.	N.A.	N.A.	N.A.
South Plant	.05	500	769	7,385
Fannin County				
Blue Ridge	.17	1,700	2,615	5,039
McCaysville	N.A.	N.A.	N.A.	N.A.

POPULATION EQUIVALENTS OF CURRENT WASTEWATER TREATMENT CAPACITY (Cont'd)

	Excess Capacity (mgd)	Population Equivalents 100 gpd	65 gpd Incremental Service	65 gpd All Service
Floyd County				
Cave Spring	N.A.	N.A.	N.A.	N.A.
County Plant - Lindale	.32	3,200	4,923	5,354
County Plant - Shannon	0	0	0	200
Rome	3.7	3,700	56,923	101,764
Forsyth County				
Cumming	.09	900	1,385	2,246
Franklin County				
Lavonia	0	0	0	0
Royston	.01	100	154	1,985
Gilmer County				
Ellijay	1.4	14,000	21,538	24,769
Gordon County				
Calhoun	1.55	15,500	23,846	53,192
Gwinnett County				
Buford				
Southside	.5	5,000	7,692	11,385
Westside	.16	1,600	2,462	2,946
County Plants [1/]				
Beaver Ruin/Sweetwater Creek	.3	3,000	4,615	38,462
Big Haynes Creek	.28	2,800	4,308	7,492
Camp Creek School	.01	100	154	423
Crooked Creek	2.8	28,000	43,077	51,538
Days Inn	.005	50	77	105
Holiday Inn	.005	50	77	265
Jacks Creek	.005	50	77	427
Jackson Creek	1.36	13,600	20,923	29,923
Lilburn	.025	250	385	519
Snellville	N.A.	N.A.	N.A.	N.A.
Habersham County				
Baldwin	.263	2,630	4,046	4,245
Clarkesville	.35	3,500	5,385	7,538
Cornelia	1.0	10,000	15,385	23,462
Demorest	.382	3,820	5,877	5,974
Hall County				
Gainesville				
Flat Creek	2	20,000	30,769	57,692
Linwood	2	20,000	30,769	36,154
Lula	.07	700	1,077	1,131

POPULATION EQUIVALENTS OF CURRENT WASTEWATER TREATMENT CAPACITY (Cont'd)

	Excess Capacity (mgd)	Population Equivalents 100 gpd	65 gpd Incremental Service	65 gpd All Service
Haralson County				
Bremen				
Baxter Creek	.1	1,000	1,538	2,077
Buck Creek	.01	100	154	2,900
Buchanan	.09	900	1,385	2,015
Tallapoosa	.3	3,000	4,615	5,692
Heard County				
Franklin	0	0	0	307
Jackson County				
Braselton	.05	500	769	876
Commerce				
City Plant	0	0	0	4,769
Davis	.37	370	569	731
Holiday Inn	.026	260	400	480
Jefferson	.085	850	1,308	1,496
Maysville	0	0	0	323
Lumpkin County				
Dahlonega	.52	5,200	8,000	9,077
Madison County				
Comer	.04	400	615	885
Murray County				
Chatsworth	0	0	0	3,538
Paulding County				
Dallas				
North Plant	N.A.	N.A.	N.A.	N.A.
West Plant	.156	1,560	2,400	3,800
Pickens County				
Jasper				
East Plant	N.A.	N.A.	N.A.	N.A.
West Plant	0	0	0	238
Polk County				
Cedartown	0	0	0	1,000
County Plant - Aragon	.105	1,050	1,615	1,992
Rockmart	0	0	0	0
Rabun County				
Clayton	.03	300	462	1,162

POPULATION EQUIVALENTS OF CURRENT WASTEWATER TREATMENT CAPACITY (Cont'd)

	Excess Capacity (mgd)	Population Equivalents 100 gpd	65 gpd Incremental Service	65 gpd All Service
Stephens County				
Toccoa				
City Plant	.11	1,100	1,692	3,308
Eastanolle Creek	.35	3,500	5,385	12,308
Eastanolle School	N.A.	N.A.	N.A.	N.A.
Towns County				
Hiawassee	.089	890	1,569	1,428
Young Harris	N.A.	N.A.	N.A.	N.A.
Union County				
Blairsville	.035	350	538	754
Walker County				
Chickamauga	3.0	30,000	46,154	56,923
Lafayette	1.6	16,000	24,615	53,923
White County				
Cleveland	.12	1,200	1,846	3,085
Whitfield County				
Dalton	0	0	0	0

1/ Plant to be abandoned: Claiborne Manor, Glenn Forest, Lee Acres, Redland Creek (Lawrenceville), River Oak Village, Shannon Woods, and Shoal Creek (Lawrenceville), all in Gwinnett County

mgd: million gallons per day

gpd: gallons per day

Source: Georgia Environmental Protection Division, monthly operating reports; calculations by Economic Development Laboratory

Other plants are close to capacity or had very little capacity to begin with. Those municipalities with less than .1 mgd excess capacity are:

Bartow County plants	Clayton	Hiawassee
Blairsville	Comer	Jefferson
Bowdon	Cumming	Lula
Braselton	Dawsonville	Royston
Bremen[1/]	Douglasville -- (south plant)[1/]	Summerville
Buchanan		

Of these plants, nine are expecting or have received funding under PL 92,500, but the timing of funding varies. Some plants are already under construction while others cannot expect to receive funding for many years. In addition, some plants, though not hydraulically overloaded, are organically overloaded or have operational problems to the extent that the regulatory agencies will not approve further expansions to service areas.

In general, a municipality that does not operate its wastewater treatment plant in a conscientious manner so as to meet the conditions specified in the discharge permit can expect to receive the attention of the regulatory agencies. A consistent violation of permit parameters will eventually result in the execution of a consent order and/or a sewer ban. Violations can also result in substantial fines. It is therefore imperative that municipalities operate and maintain their wastewater treatment plants within the legal limits specified by the permit.

It is also necessary to report various parameters to the regulatory agencies, since failure to do so can result in disapproval of various kinds of sewer expansion plans including provision of service to a new industry or public housing. All entries in Table 9 with "N.A." (not available) in the current flow column indicate that the municipality is not meeting its reporting obligations.

Recommendations

Virtually all municipalities covered in this survey are experiencing operational

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1/ Expecting funding under PL 92-500.

problems resulting from inadequate maintenance, hydraulic or organic overloads, or inadequate reporting mechanisms. They could be assisted by the establishment of an advisory organization which could provide laboratory services for analyses and consultation on operational problems and maintenance procedures. Assistance in securing trained personnel or helping to underwrite training programs might be undertaken by ARC.

The importance of meeting the requirements of discharge permits and of insuring compatibility of industrial wastes when negotiating for new industrial facilities ought to be emphasized to all local developers. Also, since the process for upgrading or expanding existing wastewater treatment systems is long, complicated, and expensive and since funds for such expansions are limited, other options available to municipalities ought to be explored. For example, the reduction of extraneous flows to the system from rainfall or high groundwater could be accomplished with a series of regular inspections and sewer line repairs. These might be as meaningful as the physical expansion of some existing plants. Also, water conservation measures can reduce the need for treatment expansion, even when no water supply constraint exists. Such measures can be effective where some advanced waste treatment is required, and treatment costs are likely to be high.

Finally, the Appalachian Regional Commission might assist communities scheduled to receive financial assistance in upgrading wastewater treatment plants with mechanisms for financing expansions within the service areas or enlarging the capability to construct service lines to potential new industrial users. Of course, these would have to be evaluated so as not to aggravate an already overloaded plants, or even creating such a condition. Smaller municipalities (under 3,500 population) could be encouraged to explore set-asides of funds for "innovative and alternative technologies," especially where no treatment system exists or where septic tank problems are becoming of major concern.

Finally, some efforts should be made to refine the current inventory of municipal capacity and to keep it updated. This would provide a meaningful service

to potential industrial facilities so they can easily ascertain where their type and volume of wastewater can be discharged into municipal systems without further burdening the treatment plant.

INDUSTRIAL LAND AVAILABILITY

Need for Assessment

Industrial site land is an integral part of any economic development program which seeks to achieve industrial expansion and diversification. This is a basic tenet of Enterprise Development program of the Appalachian Regional Commission to improve the living standard of Appalachian Region residents, and to increase incomes of area residents through improved employment opportunities which will provide higher salaries and wages. Developing new enterprises, or expanding existing operations, is the principal means available to accomplish these objectives.

Successful enterprise development programs must have a land component. In the case of the Appalachian Georgia Region, that component would be the total of all estimated site land needs of every county within the Region. This can provide a benchmark, or frame of reference, for overall industrial site needs. While no areawide figure based on county-by-county projections presently exists, such a tool can provide ARC personnel and local officials a guide to estimated future needs on both an area-wide and/or an individual county basis. In this way, industrial land needs of specific growth centers can be monitored as well as those of the entire Region.

The following system of site inventory is proposed for use by ARC/Georgia and its member counties to determine area and sub-area industrial lands needs. As indicated below, this is most applicable to the 1980-90 period, and will require revision before the end of that decade.

Methodology

The first step is to determine how much land will be needed by a particular target year. Then, a determination must be made of how much land will be available to meet the projected need. The third step is to determine if the difference is a positive number, an indication that the amount of land projected to be available will not provide for growth needs; should this be a negative number, it is

an indication that a current overabundance of industrial land exists, and suggests that cutbacks in industrial site reserves could be made, or that some land could be diverted to other uses. (See Table 11).

One of the assumptions made in this analysis is that the acreages reported from individual counties represent tracts of land which can, and will, be developed for industrial development purposes. If these tracts fail to meet standards which will make them suitable for acquisition or development, the estimates of currently available acreage will be too high, and very likely some communities will be caught short in meeting anticipated land needs.

This methodology calls for determining the average number of employees per gross industrial acre occupied. Using data correlating manufacturing employment as a percentage of total population, a manufacturing density index has constructed. Assuming that 1990 manufacturing employment will represent the same percentage of total population as it exists for the 1979-80 period, estimates have been made of 1990 manufacturing employment. These are based upon accepted county population projections for 1990.

Once estimates of 1990 manufacturing employment were developed, manufacturing densities per industrial acre in 1990 were calculated. The acreage needed in the target year is derived using a formula: $Fn = \frac{Pn \times Dy}{My}$, where

Fn is Total Acreage required for industrial use by 1990 (n)

Pn is Estimated Total Population in 1990 (n)

Dy is Current Percent of Population engaged in manufacturing in the county (y)

My is Current Density of Manufacturing employment per gross acre in the county (y)

In order to arrive at the net acreage required, a formula was applied:

$Xn = Fn - (An-Ei) - Bn$, where:

Xn is Unidentified Raw Land which must be converted to industrial class by 1990 (n)

Fn is Total Acreage required for industrial use in 1990 (n)

An is Total Industrial Acreage available in 1990 (n)

Ei is Accumulated Absorption of industrial land over the period (i)

Bn is Acreage identified as potential, but must be upgraded by 1990 (n)

In this fashion, net deficits and surpluses in available industrial site lands can be computed. The difference between the acreage needed by 1990 and the acreage not being absorbed will give a measure of land surplus or required by 1990.

Analysis

There appears to be a surplus of industrial land in the Region contrasted with estimated needs by 1990, although six counties are on the deficit side and should obtain more acreage. (See Table 11). The most critical deficit in the area appears to be that in Stephens County which will require over 230 acres by 1990. Overall, the Region has an industrial land surplus of over 20,000 acres for the target year 1990.

One caveat persists, however; some of the surplus acreage may not be in accessible locations where they will be needed. Furthermore, if the density ratios in the coming decade become smaller, and if industrial growth prevails into the 1990-2000 decade at the same rate, a general deficit will be encountered in most counties. Obviously, a current updated index of industrial land availability and of density occupations should be maintained.

Table 11

PROJECTED INDUSTRIAL LAND REQUIRED IN APPALACHIAN GEORGIA BY 1990

	Estimated 1990 Population	Estimated 1990 Mfg. Employment	Mfg. Employment Density	Indust. Acreage Needed, 1990	Acres Not Used	Additional Acreage Needed or Surplus
Appalachian Georgia Region						
Coosa Valley APDC						
Bartow	53,900	10,780	8	430	1,178	-748
Catoosa	44,300	4,430	12	112	346	-234
Chattooga	25,200	5,292	12	45	664	-619
Dade	13,900	278	3	8	138	-130
Floyd	93,400	15,878	7	362	2,569	-2,207
Gordon	33,500	7,370	10	134	617	-483
Haralson	19,900	5,771	22	31	376	-345
Paulding	31,100	933	8	45	443	-398
Polk	37,700	5,278	8	94	727	-633
Walker	65,300	6,530	7	134	340	-206
Georgia Mountains APDC*						
Banks	7,700	3,311	40	8	-55	63
Dawson	5,100	204	10	2	18	-16
Forsyth	30,600	2,448	18	34	115	-81
Franklin	15,300	1,683	11	11	255	-244
Habersham	26,800	4,556	21	28	767	-739
Hall	87,400	11,362	15	177	235	-58
Lumpkin	12,400	620	14	8	-44	52
Rabun	12,100	1,815	9	146	254	-108
Stephens	26,000	5,980	23	35	-197	232
Towns	5,700	114	7	4	80	-76
Union	9,400	1,128	22	9	102	-93
White	10,700	1,070	16	20	21	-1
North Georgia APDC						
Cherokee	56,100	3,366	12	75	44	31
Fannin	17,000	1,190	37	5	0	5
Gilmer	11,900	2,023	9	27	-10	37
Murray	21,000	5,460	9	132	160	-28
Pickens	13,600	2,040	8	62	165	-103
Whitfield	83,700	26,784	10	77	244	-167

PROJECTED INDUSTRIAL LAND REQUIRED IN APPALACHIAN GEORGIA BY 1990 (Cont'd)

	Estimated 1990 Population	Estimated 1990 Mfg. Employment	Mfg. Employment Density	Indust. Acreage Needed, 1990	Acres Not Used	Additional Acreage Needed or Surplus
Other Counties						
Barrow	24,400	3,416	30	26	1,047	-1,021
Carroll	71,300	12,834	10	333	657	-324
Douglas	83,500	835	4	77	178	-101
Gwinnett	216,200	17,296	4	2,062	10,980	-8,918
Heard	6,500	585	6	11	44	-33
Jackson	29,400	3,528	35	21	2,334	-2,313
Madison	20,700	1,035	18	10	-147	-137
Total, all areas	1,322,700	177,223	--	4,795	24,939	-20,144

Indust. -- Industrial
Mfg. -- Manufacturing

*Excludes Hart County

DEVELOPMENT EFFORT

It is axiomatic in economic development that the most important single ingredient to successful development programs is local leadership. The effective marshalling of local resources depends upon the caliber and the depth of that leadership which supports and directs community organizations. The organization, in ideal circumstances, should inventory the available resources, and seek opportunities for the most desirable utilization of those resources.

An enterprise development program ideally meshes the efforts of the public and private sector into a single working mechanism. Whether the front end responsibility and public visability is assumed by a public agency or a department or by a private organization, the most important measurements are the results accomplished and the amount of cooperation and coordination which is achieved with the least amount of disharmony and a minimum of competitive attitudes.

The size of the community, as well as the degree of interest and involvement, have considerable influence upon whether more than one development organization can operate in the community. In many communities of the Appalachian Georgia Region, the chamber of commerce is the commonly accepted development organization on the local level. Most of the counties have industrial development authorities which are the funding vehicles used for financing construction of new plant facilities, and on occasion, warehousing and distribution facilities. Some communities and counties have created development corporations or companies which concentrate on the promotion of home-grown industry, as well as in the attraction of facilities of established firms outside the area. Frequently, where a fulltime paid executive is employed to deal with economic growth that person will be employed by the chamber of commerce. A few of the communities in the region have staff personnel assigned from municipal or county government to deal with economic development objectives.

Measures of the effectiveness of such efforts are largely subjective. However, there are certain standards which professional developers operating on

a regional or state level can apply in a reasonably objective fashion. Among important indicators to be used in making such assessments are the following:

Information: How complete and accurate is local data? Is it kept reasonably current? Is the usual community inventory or profile supplemented with specific data on labor supply, with wage and fringe benefits, and with information on land availability? How extensive are efforts made to distribute this information?

Land Availability: Have individual potential industrial sites been identified? Are industrial districts planned or under development? What steps are being taken to provide utility services to acceptable industrial areas? Is suitable and useable information developed on each potential and existing industrial site?

Financing: What programs have been generated to provide appropriate financing support for new enterprise developments? Have industrial revenue bonds been used to assist new industry? Is an industrial authority operative in the county? Are other types of financing offered available?

Executive: Is a full-time executive employed to represent the community in making initial contacts with various enterprises considering the area for expansion? Has the executive participated in educational and training courses? Does the executive seem to have the full confidence of local leadership and outside development professionals?

Cooperative Efforts: Is there more than one development group operating in the community? What kind of internal working relationships have been established? Are they effective?

Funding Sources: Do local citizens and institutions participate in funding the development thrust? Does funding seem to be adequate? Does funding exist for publication of basic economic data, for promotional efforts, for respectable office quarters? Are external funding sources (i.e. state or federal) considered for certain projects? Have such efforts been successful?

Results: How successful have been the economic development efforts, in terms of new jobs, new firms, expansions by existing business, attraction of new enterprises? Was local development organization actively involved in bringing about these changes?

The development efforts in each of the counties and communities in the Appalachian Region have been reviewed by several knowledgeable and competent observers and certain categories established. Little comparison was made with comparable efforts in other parts of Georgia or in the southeast; rather, the comparisons were made on an internal basis within the Region. Figure 9 shows the results of the analysis.

In the top category were judged (in alphabetical order):

Calhoun/Gordon County	Lawrenceville/Gwinnett County
Carrollton/Carroll County	Rome/Floyd County
Gainesville/Hall County	Toccoa/Stephens County

Recommendations

This type of analysis should be subject to an impartial review at least annually. It will serve to furnish some guidance on the progress which local groups are making in upgrading the economy and diversifying the economic base.

Efforts of professional developers, particularly those on the staffs of the multi-county development districts, ought to be focused on those counties and communities in the two lower categories. These are the geographic areas that require the largest amount of outside consultation and assistance. Workshops and seminars dealing with the basics of enterprise development need to be conducted in each of these localities and strenuous efforts exerted to develop the basic economic data on which local leadership can make sound decisions.

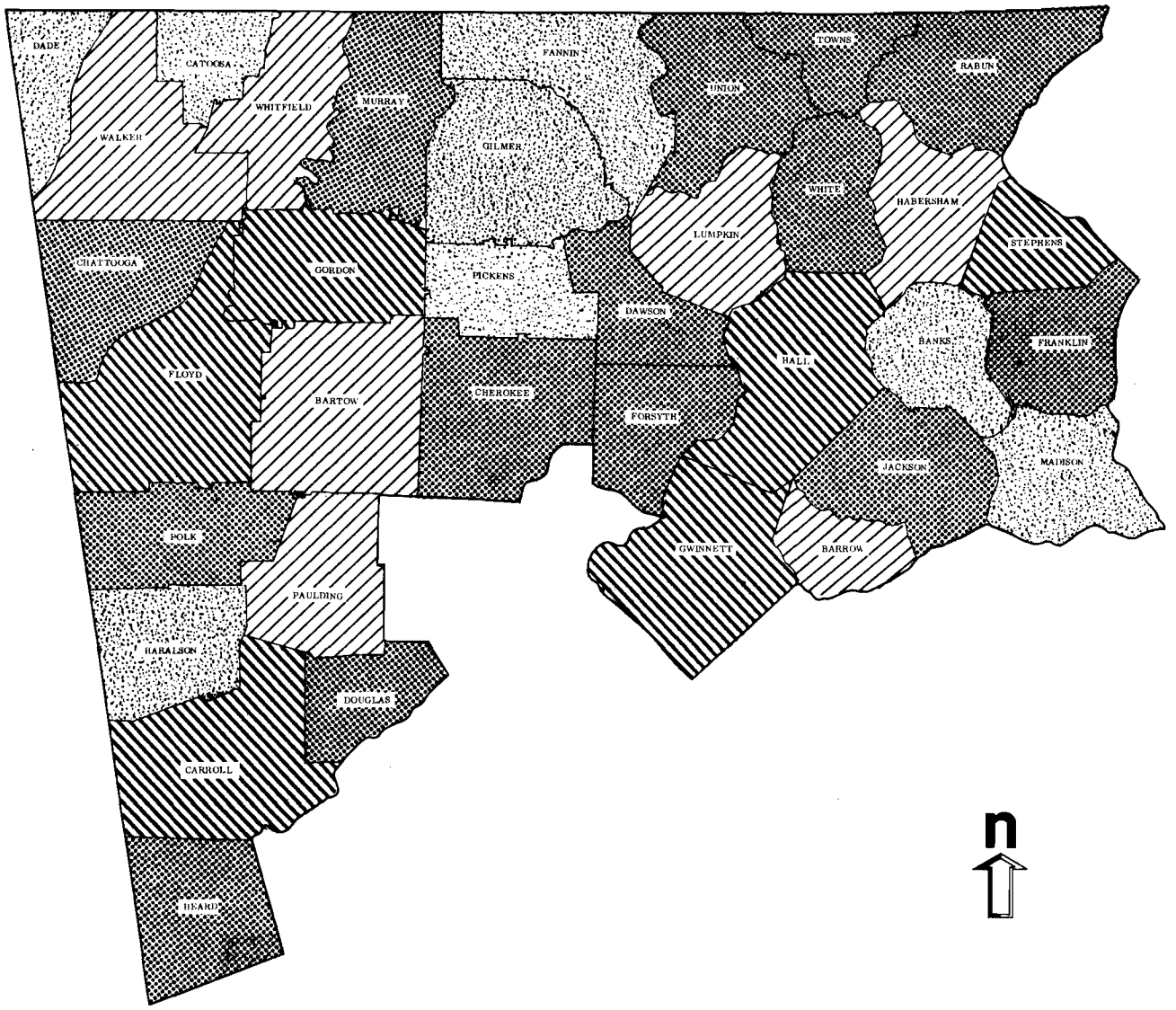

Figure 9
RELATIVE MEASURE OF DEVELOPMENT EFFORTS

ANALYSIS OF MANUFACTURING OPPORTUNITIES

Industry Selection Considerations

The analysis of the resource base of the Appalachian Georgia Region revealed strengths and weaknesses in the economy and some neutral areas where they exist. Where possible, comparability was shown. The results of this analysis provided input into the development of an industry selection model that could be used to identify those industries best suited for the Region. The industry selection model as constructed, and described in detail below, considered the following findings:

1. The Appalachian Region of Georgia is already more highly industrialized than the average for the state or nation. Additional industrialization, therefore, should be more highly selective, concentrated on attracting those industries that are most desirable for the Region.

2. Manufacturing employment in the Region accounts for half of total employment, much higher than for Georgia or the nation. However, wholesale, retail, finance, and service industries are growing substantially. With the income level of the area gradually approaching the national average, the possibility of expanding these income-consuming trades in the Region becomes more feasible.

3. The major source of employment in manufacturing within the Region is the textile mill industry, particularly the carpet and rug industry. This industry has contributed much in upgrading the total economic structure of the Region, and is an active important part of the Region's economy. Other significant manufacturing sectors are apparel and food processing. Because of employment concentration in these relatively few categories, consideration should be given to diversifying the Region's employment structure.

4. Current data on the availability of labor, and labor force participation rates indicate that labor-intensive industry could be utilized advantageously in the Region.

5. The natural resource base for the Region is limited, but seems to be well utilized, particularly in regard to stone, clay, and forest resources.

Although water is readily available in the Region, for industrial purposes, there are growing spot shortages. Consideration should be given to industries with low water requirements in this area. Consideration also should be given to industries which require only small amounts of natural gas, since the area has had problems with supply.

With these strong potentials and constraints in mind, an industry selection model for the Appalachian Georgia Region was developed. The procedure used to identify industry candidates involved two distinct screening matrices. The Feasibility Screening Matrix identified industries whose basic requirements or formats of operation most closely correspond to the resource base of the Appalachian Region. After these industries which related to the Region's resources had been identified, a Desirability Screening Matrix was applied to screen industries according to the degree to which they correspond to regional development objectives.

Although the emphasis of the industry selection model is on attraction of new plants, it should be noted that economic development must pay equal attention to encouraging the expansion of existing facilities and services.

Feasibility Screening

The purpose of the Feasibility Screening Matrix was to screen the 448 four-digit manufacturing industries identified in the Standard Industrial Classification Manual in order to identify those industries whose location requirements most closely match the potentials of the Region. The screening criteria used, the weights assigned to the screening criteria, and a description of the Feasibility Screening Matrix industry results are discussed below.

Screening Criteria

Several criteria were applied to the 448 industry groups to identify the most feasible industries. All industries were arranged from highest to lowest for each category. The ranked industries were then subdivided, and relative values were assigned to each group. The decisions of where to establish the limits for the

three groups were based on a statistical analysis, and other considerations.

Criterion 1 - Labor Skill Requirements. Given the level of blue-collar employees in the Region compared with other regions, it was felt that an industry group which had as one of its characteristics a high percentage of blue-collar employees (emphasizing those employed as craft and kindred workers, operatives, and non-farm laborers) would be a candidate industry.

The percent of blue-collar workers employed by each industry was the measure used.[1/] The higher the percent, the higher the score an industry received. The categories used in ranking are as follows:

9 = over 80 percent operatives

7 = 70-79 percent operatives

5 = 60-69 percent operatives

2 = less than 60 percent operatives

Criterion 2 - Forward and Backward Linkages. This criterion was included to measure the significance of industry groups linked to either suppliers or with markets in proximity to the Region. An industry received a score which reflects the degree to which it had either forward or backward linkages with existing industries in the Region's immediate market area.

Input-output tables based upon national industry structures were used for identification of linkages. The linkage analysis was based upon the most important activities now found in the Region. The activities purchasing from these industries were then identified (forward linkages), as were the industries which supply these major activities (backward linkages).[2/] This pattern of linkages is based on interactions between different types of industries, not specific firms. Many of these

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1/ U.S. Department of Commerce, 1970 Census of Population, Occupation by Industry, 1972.

2/ U.S. Department of Commerce, Input-Output Structure of the U.S. Economy: 1967, Volume 1, Direct Requirements for Detailed Industries, 1974; see also Updated Input-Output Table of the U.S. Economy; 1972 (1979).

linkages involve firms in the study area, but it is not possible to precisely indicate the extent to which supplies and demands are actually located in the study area. The industries were then weighted:

9 = more than 10 linkages

6 = 6 to 10 linkages

3 = 0 to 5 linkages

Criterion 3 - Water Requirements. Although both groundwater and surface water are available in the Region, most of the prospective industrial operations in the area are likely to rely upon municipal systems. Few significant locations exist where large-scale manufacturing using enormous amounts of surface water can be utilized. This condition, examined in conjunction with stringent waste water controls and the enormous costs of installing independent self-contained water systems, perforce makes dependence upon municipal-served water the most attractive alternative. Of course, even with dependence upon municipal service, there are constraints as to effluent content and sewerage treatment capacity as discussed elsewhere in this report. Based upon this approach, those industries which are indicated to have limited or modest water requirements appear most feasible for the Region. While water intake is not easily determined, the discharge of water, by three-digit industry category, can be used as a reliable measure of water demand.[3/] The industries were weighted:

9 = 0 to 100 million gallons

7 = 101 to 250 million gallons

5 = 251 to 500 million gallons

3 = 501 to 1,000 million gallons

1 - over 1,000 million gallons

Criterion 4 -- Product Shipment to Local/Regional Markets: The ability to serve regional and national markets is considered an important characteristics for a candidate industry, especially in view of the present markets in the Region.

3/ U.S. Department of Commerce, 1972 Census of Manufactures, Water Use in Manufacturing.

Identification of industry that serves regional and national markets was measured by a surrogate percentage product shipment in mileage.[4/] The industries were weighted:

9 = over 59.9 percent of shipments were over 300 miles

6 = 46.6 percent to 59.9 percent of shipments were over 300 miles

3 - less than 46.6 percent of shipments were over 300 miles

Criterion 5 - Labor Force Requirements. After examining the population densities and the labor force resources of the Region, it becomes obvious that firms which have small- to medium-size work force requirements would be more likely to consider specific locations within the Appalachian area. This characteristic also conforms to the prevalence in the area of small industrial sites which could accomodate firms whose land requirements are not excessive. In order to arrive at some measure of labor intensity, a selection was made of industry groups based upon typical employment profiles.[5/] Weights assigned were:

9 = employment under 100 persons per plant

6 = employment between 101 and 250 per plant

3 = employment over 251 per plant

Criterion 6 - Rural/Urban Preference. Another feasibility factor deemed appropriate is the measurement of traditional orientation that industry groups may have toward rural or to urban locations. This measure is imprecise, because of the blurring of terminology for a definition of "rural" as well as the absence of clear and positive data. Most of the data which was developed pertains only to the three-digit level. However, by examination of the current employment of three-digit industry groups in Standard Metropolitan Statistical Areas in the southeast, ratios with state local employment were constructed.[6/]

4/ U. S. Department of Commerce, 1972 Census of Manufactures, Volume 1, Subject and Special Statistics, 1976.

5/ U. S. Department of Commerce, Industrial Location Determinants, 1971-1975 (1973).

6/ U. S. Department of Commerce, County Business Patterns, 1976 (1978).

Weights assigned for this characteristic:

9 = over 65 percent of employment in non-SMASs

6 = 35 to 64 percent of employment in non-SMSAs

3 = less than 35 percent employment in non-SMSAs

Criterion 7 - Natural Gas Requirements. The relatively limited supply of natural gas, as well as the somewhat restricted service systems, both act as a locational advantage for those industries which require large quantities of natural gas. In order to account for this condition, a variable measuring the value added per 1,000 cubic feet of natural gas was constructed.[7/] For two firms producing approximately the same dollar output, the less intensive user of natural gas would be considered more feasible for the Region. Weights established were:

9 = low gas requirements -- over $307 of value added per 1,000 cubic feet of natural gas

6 = moderate gas requirements -- between $130 and $307 of value added per 1,000 cubic feet of natural gas

3 = high gas requirements -- below $130 of value added per 1,000 cubic feet of natural gas

Criteria Weighting Procedure

Each of the 448 candidate industries was screened, using the above criteria to identify those considered to be the most feasible for the Region. The result is a matrix displaying favorable characteristics for each industry group. In order to provide a single measure of feasibility, and to provide a means for arraying the candidate industries relating to the Region's resources, different weights were assigned to each of the criteria. These are identified in Table 12.

7/ U. S. Department of Commerce, 1972 Census of Manufactures, Subject and Special Statistics, 1976.

Table 12

FEASIBILITY MATRIX SCREENING CRITERIA WEIGHTS

Criterion	Weight
Labor Skill Requirements	10
Forward and Backward Linkages	5
Water Requirements	5
Product Shipment to Local/Regional Markets	10
Labor Force Requirements	5
Rural/Urban Preference	10
Natural Gas Requirements	5

Screening Results

The total feasibility score for an industry was determined by multiplying by the assigned weights the score obtained by that industry on each factor, and then summing the seven values. Those 125 industries whose total scores were highest are considered to be the most feasible since they most closely relate to the Region's resources and existing economic structure. The total feasibility score for an industry was the basis for more detailed examination, using the Desirability Screening Matrix.

Table 13 presents the distribution of the feasibility scores by major industry groups (two-digit SIC codes), depending upon the degree of potential each has. Three groups were selected: those industries for which the Region's potentials had the maximum attraction (feasibility scores of above 359); those for which the potentials had some measure of attraction (scores between 201 and 309); and those for which the potentials seemed of limited attraction (scores below 201).

Table 13

DISTRIBUTION OF INDUSTRIES BASED ON REGION'S ATTRACTIONS

Two-Digit SIC Code		Maximum Attraction (Score Above 359)	Some Attraction (Score 251 to 359)	Limited Attraction (Score Below 251)	Total
20	Food	5	15	26	46
21	Tobacco	2	2	0	4
22	Textiles	4	26	0	30
23	Apparel	32	1	0	33
24	Lumber and Wood	6	11	0	17
25	Furniture	6	7	0	13
26	Paper	0	17	0	17
27	Printing and Publishing	0	5	12	17
28	Chemicals	0	9	19	28
29	Petroleum Refining	0	2	3	5
30	Rubber and Plastics	1	4	1	6
31	Leather	4	7	0	11
32	Stone, Clay, and Glass	0	11	16	27
33	Primary Metals	0	5	21	26
34	Fabricated Metals	2	20	14	36
35	Machinery	0	36	8	44
36	Electrical and Electronic Machinery	4	33	2	39
37	Transportation Equipment	0	8	8	16
38	Instruments	0	9	4	13
39	Miscellaneous Manufacturing	9	10	1	20
	TOTAL	75	238	135	448

Desirability Screening

In the Feasibility Screening Matrix, the 448 industry groups were screened to identify the most feasible candidates for further investment. In a further refinement, the 125 "most feasible" industries were again screened, using certain desirability characteristics.

Development and investment objectives are required to create a strategy which can produce the desired results, reflecting both the Region's needs and aspirations. The North Georgia Area Planning and Development Commission staff assisted in identifying certain development goals which were translated into a set of criteria. These criteria included the diversification of the economic base, historical and projected growth rates, the utilization of the existing labor force, and the attraction of higher wage activities.

These criteria were then translated into measurable characteristics and applied to the 125 "most feasible" candidate industries. All these were arrayed from the highest to lowest, and subdivided to determine how one four-digit industry compared with others for specific desirability criteria. Industries that ranked highest in terms of the criteria were considered "very desirable," another group are considered "desirable," and the lowest group ranked "least desirable" industries. The decision where to establish these limits were based on established analyses and other considerations. The screening criteria are described below.

Criterion 1 - Historical Growth Rates. This criterion measures actual growth in domestic output as the average annual percent change at producers' value in 1963 dollars between 1959 and 1973.[8/] It was selected for inclusion because it identifies historical growth industries, thus providing insight on those industries most likely to locate new plants in new regions. If an industry is declining, in most cases it will likely be a less desirable target for industry-attraction programs.

8/ U.S. Department of Labor, Bureau of Labor Statistics," Revised Industry Projections to 1985," Monthly Labor Review, November 1976.

The industries were weighted:

10 = Very high growth: annual average percent change ouput recording a 2.30 percent gain or better

8 = High growth: output change between 1.80 percent and 2.29 percent

6 = Moderate growth: output change between 1.00 percent and 1.79 percent

4 = Low growth: output change between 0 percent and .99 percent

2 = Declining: output change on negative side

Criterion 2 - Projected Growth Rates. Projected growth of an industry is also an important factor in this analysis since high-growth industries are likely to be those that will have the strongest inclination to move into a new area, or to provide new strong enterprises. This criterion measures projected growth rates in domestic output as the average annual percentage change at producers' value in 1963 dollars between 1980 and 1985.[9/] The industries were weighted:

10 = Very high growth: annual average percent change output recording a 1.20 percent gain or better

8 = High growth: output change between .80 percent and 1.19 percent

6 = Moderate growth: output change between .20 percent and .79 percent

4 = Low growth: output change between 0 percent and .19 percent

2 = Declining: output change on negative side

Criterion 3 - Level of Labor Intensity. A desirable attribute for new enterprises in the Region is that they be labor intensive. This criterior is measured by value added per employee and, for two industries producing the same dollar output, the industry which uses more employees is considered more desirable.[10/]

9/ U. S. Department of Labor, Bureau of Labor Statistics, "Revised Industry Projections to 1985," Monthly Labor Review, November 1976.

10/ U. S. Department of Commerce, 1972 Census of Manufacturers, Volume 1, Subject and Special Statistics, 1976.

The industries were weighted:

10 = Highly labor intensive: below $16,000 of value added per employee

8 = Moderately labor intensive: between $16,000 and $21,000 of value added per employee

6 = Approximately even mix between labor and capital: between $21,001 and $26,000

4 = Moderately capital intensive: between $26,001 and $34,000 of value added per employee

2 = Highly capital intensive: over $34,000 value added per employee

Criterion 4 - Wage Levels. The inclusion of a wage criterion is important since higher paying employment opportunities will attract additional entrants into the labor market and reduce population out-migration trends. This criterion was defined as the 1974 production worker average weekly earnings for an industry.[11/] This somewhat counterbalances the level of labor intensity above, but for two industries with about equal employment, that paying higher wages is considered more desirable.

The industries were weighted:

10 - Very high wages; over $200 per week

8 = High wages: between $184 and $200 per week

6 = Moderate rates: between $158 and $183 per week

4 = Low wages: between $137 and $157 per week

2 = Very low wages: under $137 per week

Criterion 5 - Diversification of Industrial Base. The heavy concentration of the textile industry in the Region results in a strong linkage between the Region's economy and the market for textile products. This has some applications, as well, to the food products and apparel industries. A desirable development objective in attracting new facilities is to diversify the economic base and ensure a more stable regional economy.

11/ U. S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, United States, 1909-75, 1976.

These industries were weighted:

5 = Industries other than textiles, food, apparel

2 = Food or apparel industry

0 = Textile industry (SIC 22)

Desirability Criteria Weighting

Each of the 125 "most feasible" industries was screened, applying the above criteria to identify those considered to be the most desirable for the Appalachian Region. The matrix process is simply a means to array those industries with the largest number of favorable characteristics as being desirable. In order to provide a measure of desirability and to provide a means for arraying the "most feasible" industries to reflect important development goals, different weights were assigned to each of the criteria. These are shown in Table 14.

Table 14

DESIRABILITY MATRIX SCREENING CRITERIA WEIGHTS

Criterion	Weight
Historical Growth Rates	10
Projected Growth Rates	10
Level of Labor Intensity	5
Wage Levels	5
Diversification of Industrial Base	10

Screening Results

Each of the industry groups evaluated was arranged in numerical sequence by four-digit SIC code. The total desirability scores were calculated by multiplying by the assigned weights the score obtained by an industry on each criteria and then summing the five values. Of the 125 industry groups so evaluated, the 33 whose total score was highest could be considered the most desirable, since they most closely meet the characteristics previously set forth.

Table 15 presents the distribution of the desirability scores by major industry (two-digit SIC code), depending upon the degree of desirability indicated. Three groups were identified: maximum desirability (scores above 240), moderate desirability (scores of 200 to 230), and lowest desirability (scores below 190).

Table 15

DISTRIBUTION OF SELECTED INDUSTRIES BASED ON DESIRABILITY QUALITIES

Two-Digit SIC Code		Maximum Desirability (Score Above 240)	Moderate Desirability (Score of 200 to 230)	Lowest Desirability (Score Below 190)
20	Food	0	0	6
21	Tobacco	0	0	4
22	Textiles	0	0	12
23	Apparel	7	16	10
24	Lumber and Wood	0	2	10
25	Furniture	4	7	0
26	Paper	1	1	0
27	Printing and Publishing	0	0	0
28	Chemicals	0	0	0
29	Petroleum Refining	0	0	0
30	Rubber and Plastics	1	0	0
31	Leather	0	1	4
32	Stone, Clay, and Glass	0	0	0
33	Primary Metals	0	0	0
34	Fabricated Metals	5	1	0
35	Machinery	0	0	0
36	Electrical and Electric Equipment	13	4	0
37	Transportation Equipment	0	0	0
38	Instruments	1	0	0
39	Miscellaneous Manufacturing	1	10	4
	Total	33	42	50

Industries with High Potential for the Region

The total feasibility score and the total desirability score were combined for each four-digit industry in the table; consequently, the highest combined scores identify the most desirable and the most feasible industries for the Region. The ranking of the combined scores by two-digit category provides a means for identifying, in general, industries with high potential for location within the Region.

As a further refinement, those four-digit industrial groups with high potential were arrayed by the total score. Those with the highest potential (ranking above 25) and those with modest potential (ranking between 26 and 50) are listed in Table 17. It should be noted that these include a number of industries already represented in the Region -- demonstrating that what has succeeded is still a good target, especially in communities where that industry is under represented -- as well as a number of industries which appear to have requirements that can be matched at various locations within the Region.

Suggestions for practical applications of this analysis are made at the conclusion of this chapter.

Table 16

DISTRIBUTION OF INDUSTRIES BASED ON FEASIBILITY AND DESIRABILITY QUALITIES

Two-Digit SIC Code		Highest Potential (Score above 620)	Modest Potential (Score of 590-615)	Some Potential (Score below 590)
20	Food	0	0	6
21	Tobacco	0	0	4
22	Textiles	0	0	12
23	Apparel	8	12	13
24	Lumber and Wood	0	0	12
25	Furniture	4	2	5
26	Paper	0	1	1
27	Printing and Publishing	0	0	0
28	Chemicals	0	0	0
29	Petroleum Refining	0	0	0
30	Rubber and Plastics	1	0	0
31	Leather	0	0	5
32	Stone, Clay, and Glass	0	0	0
33	Primary Metals	0	0	0
34	Fabricated Metals	5	0	1
35	Machinery	0	0	0
36	Electrical and Electronic Equipment	6	4	7
37	Transportation Equipment	0	0	0
38	Instruments	0	1	0
39	Miscellaneous Manufacturing	1	4	10
	Total	25	24	76

Table 17

FEASIBILITY-DESIRABILITY RANKING OF FOUR-DIGIT INDUSTRIES

Highest Potential (ranked in order)	Modest Potential (ranked in order)
3622 - Industrial Controls	3662 - Radio and Television Equipment and Apparatus
2512 - Wood Household Furniture, Upholstered	2321 - Men's, Youths' and Boys' Shirts and Nightwear
3623 - Welding Apparatus, Electric	2322 - Men's, Youths' and Boys' Underwear
2519 - Household Furniture, NEC	2323 - Men's, Youths', and Boys' Neckwear
2514 - Metal Household Furniture	2329 - Men's, Youths' and Boys' Clothing, NEC
3423 - Hand and Edge Tools	2311 - Men's, Youths' and Boys' Suits and Coats
2399 - Fabricated Textile Products, NEC	3634 - Electric Housewares and Fans
3425 - Hand Saws and Saw Blades	2331 - Women's, Misses' and Juniors' Blouses, Waists, and Shirts
2391 - Curtains and Draperies	2335 - Women's, Misses', and Juniors' Dresses
3021 - Rubber and Plastics Footwear	2397 - Schiffli Machine Embroideries
3421 - Cutlery	2515 - Mattresses and Bedsprings
3429 - Hardware, NEC	2652 - Setup Paperboard Boxes
2394 - Canvas and Related Products	3635 - Household Vacuum Cleaners
3629 - Electrical Industrial Apparatus	2521 - Wood Office Furniture
3612 - Power, Distribution, and Specialty Transformers	3915 - Jewelers' Findings and Materials
2395 - Pleating, Decorative and Novelty Stitching	3944 - Games, Toys and Children's Vehicles
3613 - Switchgear and Switchboard Apparatus	3631 - Household Cooking Equipment
3432 - Plumbing Fixture Fittings and Trim	3873 - Watches, Clocks, Clockwork Operated Devices
2339 - Women's and Misses' Outerwear	2328 - Men's, Youths' and Boys' Work Clothing
2392 - House Furnishings	3914 - Silverware, Plated Wire, and Stainless Steel
2396 - Automotive and Apparel Trimmings	3911 - Jewelry, Precious Metal
3621 - Motors and Generators	2341 - Women's, Misses' and Children's Underwear
3949 - Sporting and Athletic Goods	2361 - Girls', Children's and Infants' Dresses and Blouses
2386 - Leather and Sheeplined Clothes	2381 - Dress and Work Gloves
2511 - Wood Household Furniture	2387 - Apparel Belts
	2389 - Apparel and Accessories, NEC

ANALYSIS OF NON-MANUFACTURING OPPORTUNITIES

General

The non-manufacturing private sector basically performs service and/or support activities for the existing population and industrial base. This sector generally includes such categories as health services, financial services, wholesale trade, and retail trade. The absolute levels of employment can be expected to vary a great deal from service area to service area. Absolute levels, therefore, provide little information which can be productively utilized of more reliance are the relative levels of service sector employment vis-a-vis those of the surrounding area.

An analysis of relative levels of service activity in a given area can be used productively in three ways. The first is to indicate the existing economic health of an area; the second is to use the data to monitor the effectiveness of economic development efforts; the third is to indicate, with other factors, where expansion may be productively made in a particular service area.

Service Sector Activity as an Indicator of Economic Health

Some disagreement exists as to whether rising service sector activity indicates economic health. One school postulates that the natural stages of development of a region advance from primary (agricultural and/or natural resource based) to secondary (industrial) to tertiary (service). This perspective has been criticized by those who contend that many agricultural regions can have high levels of income and development without the intermediate industrialization stage. Furthermore, it has been pointed out that the New England region experienced a large growth in the service sector (mostly personal service) following loss of the textile industry to the South. In this case, incomes were falling, unemployment was rising and, paradoxically, relative service sector employment was also rising.

In general, it appears that increases in service sector employment in areas experiencing positive population growth rates is a sign of economic health, while

a like increase in such employment during periods of population decline are indicative of economic decline, or of a less developed economic base. Therefore, it can be assumed that high levels of service sector employment are indicative of economic health.

Monitoring Economic Development Efforts

The data contained in this report provide service-sector profiles for the Georgia ARC counties. When a county achieves positive economic development efforts, its economic base should reflect those results. If an industry locates in a particular county, we assume that the activity level of banking service will expand correspondingly. If such service does not expand, then it could be inferred that the industrial expansion is not having substantial net economic impact, or there is some impediment to expansion of the banking service area.

Market Opportunities for Service Sector Expansion. Due to the nature of service sector activity which normally lags economic expansion, it is possible to identify those areas where particular services have high, moderate, or low probabilities of productive expansion. A high probability of expansion would be indicated by a combination of high economic growth and low service sector activity. A moderate probability of expansion would be indicated by a combination of either high growth and moderate service sector activity or moderate growth and low service sector activity. All other permutations of growth and service sector activity would indicate a low probability of expansion. The economic interpretation of the classification system follows from the market characteristics of the service sector.

The service sector is generally characterized by smaller, highly competitive firms in markets with few barriers to entry. Supply markets can respond easily to changes in the demand for services. In a situation which is basically static, i.e., little economic growth, the levels of service sector activity normally represent a supply and demand equilibrium even though this may be significantly lower than regional or state averages. The probabilities for market opportunities in the service sector would be much lower than for areas is

experiencing some degree of growth.

If a county is experiencing high growth rates, the levels of service sector activity would be expected to grow not only in absolute levels, but also in relative levels. A low relative level of activity in a county experiencing high growth rates should have a higher demand than would a moderate growth county with low service sector activity or a high growth county with moderate service sector activity.

Methodology

The methodology followed in this analysis of non-manufacturing employment in the Georgia ARC counties is generally analogous to the calculation of location quotients. A ratio of local activity to activity in a larger area is derived with a value greater than 1.00 indicating higher activity and a value of less than 1.00 indicating lower activity at the local level.

One important difference between the methodology employed here and that usually associated with location quotients should be noted. Location quotients are calculated to indicate the net export-import position of local manufacturing vis-a-vis that of the surrounding area. This analysis seeks to describe the relative levels of activity. To reflect this difference in perspective, county-level activity was calculated by dividing the number of employees for each service sector SIC code by the estimated population for that county rather than total employment or total sales in the county. This approach emphasizes the "population support" function of the service sector employment over the "industrial base support" function. Since the linkages between manufacturing and required service sector activity are not quantifiable, the latter is therefore considered qualitatively.

While traditional economic central place theory assumes that the service center function of cities evolves in a hierarchial fashion, for those locations that may no longer be growing, but perhaps are not in decline, the service functions will be in a state of imbalance. Similarly, for those communities growing rapidly, the service functions seem to lag the upward thrust of the economy. Generally accepted is the thesis that there are patterns of threshold population are

applicable to some of the service activities. This may explain why their presence often is lacking in the smaller locales.

Activity Level Quotient. There are three levels of comparison conducted in this analysis. The first is to compare the Georgia ARC counties with the State; the second is to compare the Georgia ARC counties (individually) with the composite of all twelve ARC states; the third is to compare the Georgia ARC counties with the nation as a whole.

This analysis was applied to the general SIC headings and all two-digit classifications for which data were available. The sparcity of data precluded the analysis of more specifically described activities. In many cases, data were not even available for analysis down to the two-digit SIC code level. Where ranges, rather than specific employment levels were given, the midpoint of the range was used. County employment ratios so calculated are marked with an asterisk (*). For comparison purposes, the ratios of regional to national and state to national were also calculated.

Analysis of Market Opportunities. Service sector activity was classified as high, moderate or low according to whether the activity level quotients were greater than 1.5, between 1.49 and .5, or less than .5, respectively. The comparison of growth versus service sector activity was conducted for SIC codes for which data were available to the two-digit level.

Probabilities of market opportunities were based on a comparative classification system:

Table 18

SERVICE SECTORS AND MARKET OPPORTUNITY

County Growth Rate	Service Sector Activity Level	Probability of Market Opportunity
High	High	Low
	Moderate	Moderate
	Low	High
Moderate	High	Low
	Moderate	Low
	Low	Moderate
Low	High	Low
	Moderate	Low
	Low	Low

Whenever the three measures of activity levels (national, regional and state) were not consistent, a range was specified with the most consistent, i.e. two out of the three, level given first. No cases of all three being different were encountered.

Results

Several observations are immediately apparent by inspection of Table 18. The three levels of measurement of activity levels are very similar. This is apparent from both an inspection of the activity levels for the individual counties as well as inspection of the national-regional comparison and the national-state comparision. The national-regional comparision revealed that the service sector activity for the 12-state ARC region did not deviate from the national levels significantly in any area. The largest positive deviation was 1.47 in SIC code 62 (security, commodity brokers and services) which is due to inclusion of New York state in the region. The second highest deviation was 1.21 for SIC code 47 (transportation services). The largest negative deviation was .78 for SIC code 70 (hotels and other lodging places).

The Georgia-national comparison also revealed a great deal of congruence, but not as completely as the regional-national comparison. Activity levels ranged from 2.96 for SIC code 51 (wholesale trade-non durable goods) to .30 for SIC codes 41 and 46 (local and interurban passenger transit, and pipelines except natural gas, respectively). Three areas were greater than 2.00, and three areas were less than .50. The remainder was between .80 and 1.20.

In general, the service sector activity levels for Georgia counties are far below all averages which is indicative of the lagging economic development of the area.

Exceptions are those counties which do have high levels of economic activity such as Floyd, Hall and Whitfield counties. These tend to reinforce the observation of increasing levels of service sector activity attendant upon economic development. It should be noted, however, that even within these strongly developing areas significant shortfalls do exist. Such shortfall areas plus those in other high growth counties represent the greater probabilities for expansion of business opportunities. These areas are summarized in Table 19.

These areas of opportunity vary from county to county. The largest number occur in the Service category, particularly business services. Also well represented are opportunities in Wholesale Trade -- Durable Goods and in Finance, Insurance and Real Estate services. A smaller but significant number are in Insurance Carriers, Wholesale Trade -- Non-Durable Goods, and in the general category of Transportation and Other Public Utilities.

Table 19

SUMMARY OF HIGH PROBABILITIES FOR

EXPANDED ACTIVITY

BARROW COUNTY	
53	General Merchandise Stores
63	Insurance Carriers
73	Business Services
83	Health Services
CARROLL COUNTY	
42	Trucking and Warehousing
50	Wholesale Trade -- Durable Goods
57	Furniture and Home Furnishing Stores
63	Insurance Carriers
65	Real Estate
89	Miscellaneous Services
FLOYD COUNTY	
65	Real Estate
70	Hotels and Other Lodging Places
73	Business Services
GORDON COUNTY	
48	Communication
50	Wholesale Trade -- Durable Goods
51	Wholesale Trade -- Non-Durable Goods
53	General Merchandise Stores
60	Banking
80	Health Services
GWINNETT COUNTY	
42	Trucking and Warehousing
49	Electric, Gas and Sanitary Services

SUMMARY OF HIGH PROBABILITIES FOR EXPANDED ACTIVITY (Cont'd)

GWINNETT COUNTY (Cont'd)

51	Wholesale Trade -- Non-Durable Goods
53	General Merchandise Stores
56	Apparel and Accessory Stores
60	Banking
61	Credit Agencies Other Than Banks
64	Insurance Agents, Brokers & Services
70	Hotels and Other Lodging Places
72	Personal Services
73	Business Services
80	Health Services
82	Educational Services
83	Social Services
86	Membership Organizations

HABERSHAM COUNTY

50	Wholesale Trade -- Durable Goods
51	Wholesale Trade -- Non-Durable Goods
58	Eating and Drinking Places
73	Business Services
80	Health Services

HALL COUNTY

63	Insurance Carriers
65	Real Estate
73	Business Services
79	Amusement and Recreational Services

MURRAY COUNTY

50	Wholesale Trade -- Durable Goods
58	Eating and Drinking Places
59	Miscellaneous Retail

SUMMARY OF HIGH PROBABILITIES FOR EXPANDED ACTIVITY (Cont'd)

STEPHENS COUNTY

50	Wholesale Trade -- Durable Goods
51	Wholesale Trade -- Non Durable Goods

WHITFIELD COUNTY

63	Insurance Carriers
65	Real Estate
73	Business Services
82	Educational Services

APPLICATION OF THE SCREENING RESULTS

A positive marketing strategy ought to be developed by any community organization or group which seeks to attract new investment to its area. As an inherent part of that strategy, the targeting of attractive and meaningful investment opportunities is an essential segment.

Through application of the screening results described previously, any well-motivated development group can begin to identify potential new investment opportunities. But in order to apply the research in accomplishing positive results, some additional work has to be performed.

The individual local economic base should be examined with relation to some of the identified feasible/desirable industries. Questions might be asked of existing industry which types of manufacturing and ancillary services might be suitable and or useful to their present operations. Suggestions ought to be elicited for specific firm names and locations to be contacted direct.

Excellent reference sources can be found in public libraries and in well-organized development organizations or departments. Several of these directories identify specific companies by the SIC code, and furnish information on the firm name, chief officers, principal operations, and locations of major units, as well as product lines. Using this type of cross-reference, a suitable mailing list can be compiled for direct mailing purposes.

The mailing piece itself should serve to introduce the community and the writer and to establish the reasons the contact is being made. Emphasis should be placed upon the obvious economic attractions that presently exist and which ought to serve as points of interest for investigation by the company being contacted. Even better and more to the point is the inclusion of information on a recent labor registration, or the existence of a usable building which has just come on the market, or the recent development of suitable industrial sites. The

contact campaign should not be of a "one shot" dimension, but rather have several phases with varying subject content.

Use of the non-manufacturing analysis requires more personal contact, alertness to opportunities to establish new firms, and publicizing of the locality's interest in assisting investment sources of that nature. It can be of considerable assistance in rendering assistance to new "start up" firms seeking to penetrate local markets.

Finally, since growing emphasis has been placed in the last decade upon the attraction of foreign investments to the continental United States, particularly to the South and far West, this represents yet another target. Authoritative sources suggest that the attraction of foreign capital for manufacturing facilities is most receptive to details about the availability of labor (especially in unskilled categories), access to specific industrial markets, and nearness to ocean port facilities. Quite obviously, the foreign investments in banking and related financial activities emphasizes urban-focused locations.

APPENDICES

Appendix Table 1

POPULATION OF APPALACHIAN GEORGIA REGION COUNTIES, 1950-1970
ESTIMATED POPULATION, 1976 and 1990

	Total Population			Estimated Population	
	1950	1960	1970	1976	1980
Coosa Valley APDC	248,487	267,269	302,739	332,100	365,200
Bartow	27,370	28,267	32,911	38,500	44,500
Catoosa	15,146	21,101	28,271	33,200	36,700
Chattooga	21,197	19,954	20,541	21,400	23,200
Dade	7,364	8,666	9,910	11,000	12,100
Floyd	62,899	69,130	73,742	78,700	84,400
Gordon	18,922	19,228	23,570	25,600	28,900
Haralson	14,663	14,543	15,927	16,600	18,000
Paulding	11,752	13,101	17,520	23,100	25,000
Polk	30,976	28,015	29,656	31,700	34,200
Walker	38,198	45,264	50,691	52,300	58,200
Georgia Mountains APDC*	141,481	154,457	176,784	197,600	216,100
Banks	6,935	6,497	6,833	6,900	7,200
Dawson	3,712	3,590	3,639	4,300	4,600
Forsyth	11,005	12,170	16,928	22,000	24,900
Franklin	14,446	13,274	12,784	13,200	14,200
Habersham	16,553	18,116	20,691	22,200	23,700
Hall	40,113	49,739	59,405	67,200	74,300
Lumpkin	6,574	7,241	8,728	9,800	10,600
Rabun	7,424	7,456	8,327	9,100	10,500
Stephens	16,647	18,391	20,331	21,500	23,200
Towns	4,803	4,538	4,565	4,900	5,200
Union	7,318	6,510	6,811	7,600	8,300
White	5,951	6,935	7,742	8,900	9,400
North Georgia APDC	99,868	107,002	131,086	156,800	170,800
Cherokee	20,750	23,001	31,059	42,700	45,100
Fannin	15,192	13,620	13,357	14,200	15,400
Gilmer	9,963	8,922	8,956	10,000	10,600
Murray	10,676	10,447	12,986	16,000	17,500
Pickens	8,855	8,903	9,620	10,700	11,800
Whitfield	34,432	42,109	55,108	63,200	70,400
Other Counties	129,930	146,296	203,235	290,800	357,400
Barrow	13,115	14,485	16,859	19,300	21,100
Carroll	34,112	36,451	45,404	55,400	59,300
Douglas	12,173	16,741	28,659	45,000	61,200
Gwinnett	32,320	43,541	72,349	126,700	166,700
Heard	6,975	5,333	5,354	5,600	6,000
Jackson	18,997	18,499	21,093	23,100	25,600
Madison	12,238	11,246	13,517	15,700	17,500

*Excludes Hart County

Sources: U. S. Bureau of the Census, Census of Population; Georgia Office of Planning and Budget, Estimates.

Appendix Table 2

MANUFACTURING EMPLOYMENT IN APPLACHIAN GEORGIA REGION COUNTIES
1956-1976

	1956	1966	1976
Coosa Valley APDC			49,758
Bartow	2,690	4,136	6,362
Catoosa	N.A.	971	1,989
Chattooga	4,923	4,664	5,341
Dade	N.A.	143	642
Floyd	12,157	12,316	12,740
Gordon	2,186	3,532	5,710
Haralson	2,013	5,752	4,877
Paulding	566	445	570
Polk	3,576	3,369	3,875
Walker	N.A.	6,778	7,652
Georgia Mountains APDC*			25,289
Banks	316	721	705
Dawson	N.A.	(D)	153
Forsyth	N.A.	870	1,120
Franklin	N.A.	1,240	1,304
Habersham	N.A.	2,934	4,441
Hall	6,661	8,468	9,356
Lumpkin	N.A.	533	468
Rabun	N.A.	1,162	1,258
Stephens	N.A.	5,150	4,626
Towns	N.A.	56	47
Union	N.A.	(D)	983
White	N.A.	767	828
North Georgia APDC			26,449
Cherokee	2,286	2,804	2,340
Fannin	N.A.	(D)	747
Gilmer	N.A.	1,057	1,864
Murray	N.A.	641	3,127
Pickens	N.A.	1,265	1,332
Whitfield	8,724	13,221	17,039
Other Counties			
Barrow	2,498	2,726	3,094
Carroll	3,535	5,663	7,832
Douglas	637	478	462
Gwinnett	2,357	3,254	7,619
Heard	127	604	(E)
Jackson	2,541	2,822	2,925
Madison	221	491	1,815

*Excludes Hart County

Source: U. S. Bureau of the Census, County Business Patterns.

Appendix Table 3

VALUE ADDED BY MANUFACTURE IN APPALACHIAN GEORGIA REGION COUNTIES
1963-1972
(in millions of dollars)

	1963	1972
Coosa Valley APDC		
Bartow	24.5	123.7
Catoosa	(D)	18.3
Chattooga	34.6	109.0
Dade	.4	9.2
Floyd	109.6	206.2
Gordon	36.0	92.6
Haralson	32.8	64.8
Paulding	1.9	2.0
Polk	29.1	58.9
Walker	30.4	117.0
Georgia Mountains APDC*		
Banks	1.7	4.1
Dawson	(D)	1.3
Forsyth	4.3	6.6
Franklin	5.1	8.2
Habersham	17.7	39.4
Hall	62.9	115.2
Lumpkin	(D)	(D)
Rabun	(D)	(D)
Stephens	25.9	51.2
Towns	.2	(D)
Union	.6	(D)
White	7.0	16.1
North Georgia APDC		
Cherokee	9.5	24.4
Fannin	(D)	13.8
Gilmer	4.1	9.9
Murray	2.8	32.5
Pickens	4.8	11.2
Whitfield	99.8	316.1
Other Counties		
Barrow	13.9	25.5
Carroll	29.2	63.2
Douglas	2.8	6.7
Gwinnett	17.9	71.9
Heard	(D)	(D)
Jackson	14.5	36.8
Madison	1.7	16.0

*Excludes Hart County

Source: U. S. Bureau of the Census, Census of Manufactures.

Appendix Table 4

PERSONAL INCOME, TOTAL AND PER CAPITA, APPALACHIAN GEORGIA REGION COUNTIES
1969-1975

	Total (millions of dollars)		Per Capita (dollars)	
	1969	1975	1969	1975
Coosa Valley APDC	851	1,477	2,825	4,455
Bartow	91	165	2,825	4,609
Catoosa	70	125	2,509	3,864
Chattooga	54	88	2,625	3,966
Dade	23	42	2,309	3,625
Floyd	224	383	3,076	4,960
Gordon	67	121	2,839	4,439
Haralson	48	78	3,009	4,535
Paulding	43	89	2,505	4,026
Polk	77	134	2,609	4,255
Walker	154	252	2,985	4,635
Georgia Mountains APDC*	462	813	2,655	4,111
Banks	16	27	2,391	4,078
Dawson	10	18	2,811	4,270
Forsyth	46	95	2,647	4,422
Franklin	34	58	2,653	4,250
Habersham	52	92	2,541	3,969
Hall	173	298	2,975	4,480
Lumpkin	21	32	2,457	3,450
Rabun	17	31	2,088	3,338
Stephens	50	85	2,476	3,871
Towns	8	15	1,636	3,054
Union	15	28	2,183	3,454
White	20	34	2,663	3,973
North Georgia APDC	361	666	2,833	4,457
Cherokee	84	168	2,793	4,317
Fannin	28	55	2,101	3,846
Gilmer	21	41	2,301	3,993
Murray	31	65	2,463	4,045
Pickens	23	41	2,449	3,963
Whitfield	174	296	3,288	4,972
Other Counties	580	1,392	2,951	5,014
Barrow	48	90	2,879	4,658
Carroll	116	242	2,641	4,587
Douglas	85	226	3,126	5,023
Gwinnett	232	654	3,355	5,640
Heard	11	21	2,017	3,622
Jackson	56	96	2,672	4,119
Madison	32	63	2,431	4,061

*Excludes Hart County

Source: U. S. Department of Commerce, Survey of Current Business.